

Dec 1976 35p

hi-fi
for pleasure

CLEAR CUT RECEPTION FROM JVC

Test Bench
JVC JR-S200c
receiver

ADC Accutrac
record deck

Study on static

Recording live
-the BBC way

Building a
quadraphonic
microphone
mixer

Lo-down
on hi-fi



If you're buying an inexpensive amplifier, what can you expect?

The chances are if you're not spending very much, you're not expecting very much. But you know, you should be.

Look at the two new Yamaha amplifiers below. The **CA410** costs **£109-91**, and the **CA610** **£149-91** including VAT at 12½%.

Not a lot. But they certainly come with a lot of features. Take the harmonic distortion level. Other similarly-priced amplifiers may give you the same power output: 25 watts per channel for the CA410, 40 watts for the CA610. But try turning them up. None of them begin to match the performance of a Yamaha. On both models, total measurable

distortion is less than 0.05%. They're also the only amplifiers in their price range with power output metres.

And here's a feature you'll rarely see on amplifiers, even if you're paying twice the price: built-in record output selectors, so you can record from one source, and play back from another at the same time.

Even the outside is somewhat unexpected. Cheaper models are often inclined to look it. But these are made by the same craftsmen who made our expensive models famous. With the same skill. The same attention to detail.

And the same is true of the corresponding tuners, the CT410 and CT610 from Yamaha. Both have features you'd never have dreamed of for the price – **£99-86** for the **CT410**, **£119-88** for the **CT610**, including VAT at 12½%.

So do expect a little more. Even though you're paying less. You can. With Yamaha.



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Yamaha CT410 Tuner

Yamaha CT610 Tuner

Yamaha CA410 Amplifier

Yamaha CA610 Amplifier

Yamaha. Yes.

Editor Trevor Preece
 Assistant Editor Elizabeth Jacques
 Advertisement Manager Dave Webster
 Art Director Stephen Rowley
 Production Manager Ramsay Gillies

Managing Director Jack Hutton
 Editorial Director Mike Sharman
 Advertisement Director Peter Wilkinson

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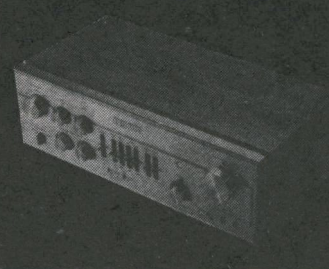
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Cover: The JVC S200L receiver, reviewed on page 66, is companioned by the CD-S200 cassette recorder, and another tasty model.

NEXT MONTH

Fashion, perhaps, could be responsible for a move back to separate pre and power amplification, and thus we feel encouraged to sound out some of these components. The cover feature for the next issue kicks off on this theme, with a view of the Lux C1000 sophisticated preamplifier. JVC's Super ANRS cassette deck, the 1720B, and an Akai GX265D reel-to-reel tape recorder also come under Hi-Fi for Pleasure's scrutiny. The subject of musicality v accuracy is pursued, under the banner of subjectivity, and Lo-Down on Hi-Fi continues. Systems for Pleasure take a more specialised turn, with emphasis this time on a home recording-cum-hi-fi installation.

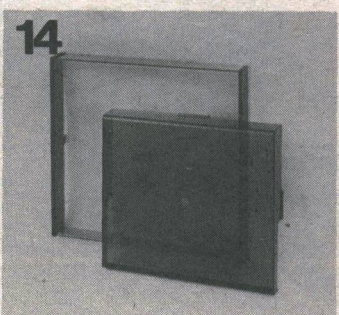
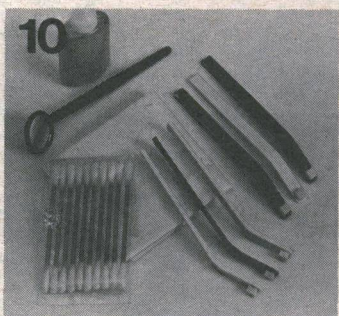
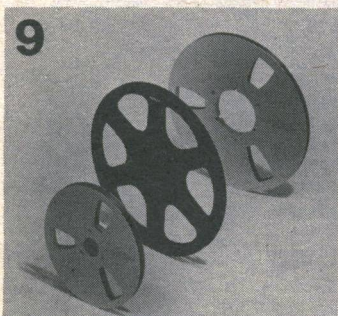
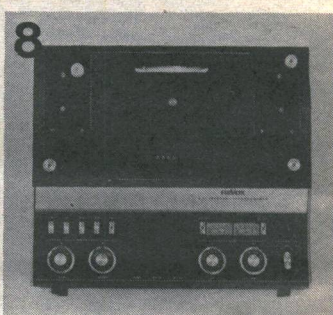
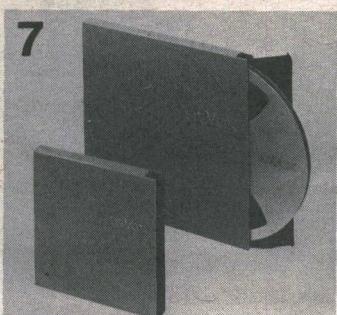
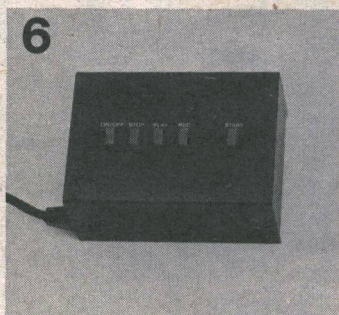
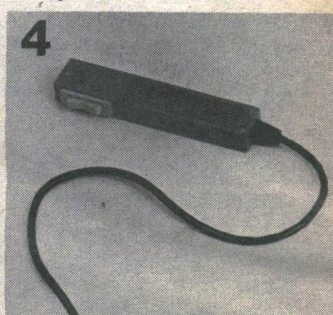
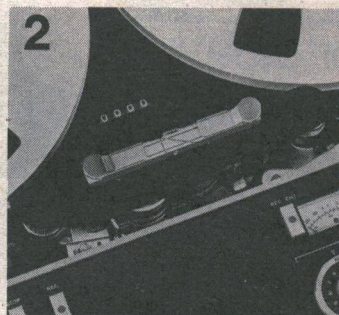


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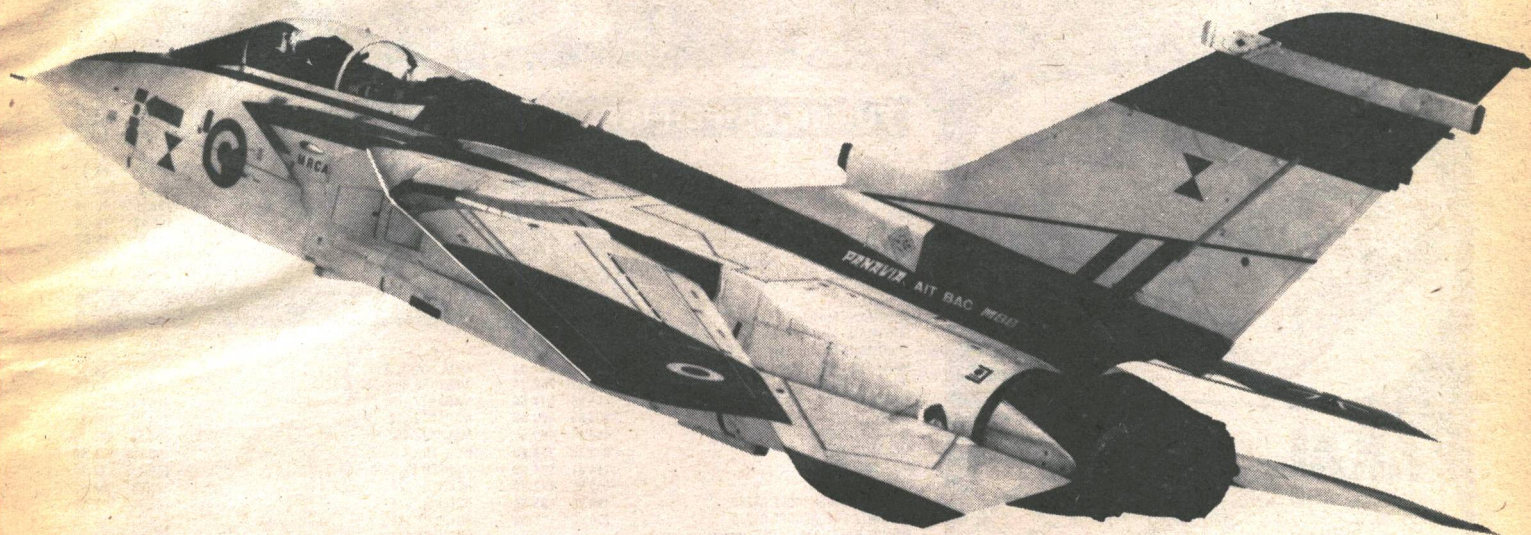
14 Dust covers of fracture-proof, smoke-tinted plastic designed to protect the A77 and A700 recorders from dust or damage when not in use.
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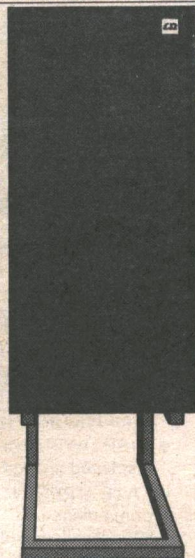
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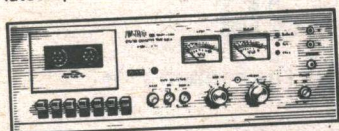
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MARANTZ 2225	234.81	194.50
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ROTEL RX 202 Mk. 2	137.50	102.90
ROTEL RX 402	192.50	141.90
ROTEL RX 602	244.50	171.90
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SANSUI 331	153.35	112.90
SANSUI 551	200.36	146.90
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MARANTZ 1040	161.97	134.75
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ROTEL RT 724	119.90	89.90
ROTEL RT 824	189.90	148.90
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CELESTION Dittion 44	227.06	159.90
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GOODMANS Achromat 250 Monitor	162.78	99.90
GOODMANS Achromat 400 Monitor	214.38	124.90
GOODMANS RB 18	72.30	48.90
GOODMANS RB 20	92.40	63.90
GOODMANS RB 35	132.58	87.50
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LEAK 3030	157.50	117.90
LEAK 3050	218.00	159.90
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MARANTZ 5G	145.69	119.50
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MARANTZ HD55	203.74	167.90
MARANTZ HD66	289.31	239.50
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SOLAVOX TK30	64.71	44.50
SOLAVOX TK45	120.06	87.90
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WHARFEDALE Linton 3XP	84.62	59.90
WHARFEDALE Glendale 3XP	115.16	87.90
WHARFEDALE Dovedale SP	197.24	139.90

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AKAI ASE 22	24.20	16.90
AKG K140	21.04	13.75
AKG K240	33.98	22.90
KOSS PRO-4AA	38.98	27.50
KOSS K6	17.27	12.75
KOSS K6/LC (with volume control)	19.74	15.75
KOSS K125	—	14.90
KOSS K135	—	18.90
KOSS K145	—	22.90
KOSS Phase 2	—	36.90
KOSS Pro 5 L/C	—	32.90
PIONEER SE205	12.69	10.50
PIONEER SE305	19.82	15.90
ROTEL RH 930 Electret Condenser	37.50	24.50

SOLAVOX 300	5.67	4.50
WHARFEDALE Isodynamic	28.00	16.50

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	Rec. Price	Our Price
AKAI 4000 DS Mk. II Stereo deck	174.00	129.90
AKAI 4000 DB Dolby Stereo deck	249.50	185.90
PHILIPS N4504 4 track DNL Stereo deck	202.50	149.90

CASSETTE RECORDERS

	Rec. Price	Our Price
AKAI CS340 Dolby stereo deck	138.75	98.50
AKAI GXC390 Dolby stereo deck	195.00	128.50
AKAI CS7050 Dolby stereo deck front load	179.50	137.50
AKAI CS7070 Dolby stereo deck front load	216.49	166.90
AKAI GXC3100 Dolby stereo deck two capstans	241.50	144.90
AKAI GXC3250 Dolby stereo deck two capstans, three heads	311.00	227.50
AKAI GXC7100 stereo deck front load	259.50	194.90
AMSTRAD 7050 Dolby stereo deck	105.18	77.90
AMSTRAD 7070 Dolby stereo deck front load	127.32	97.50
FERGUSON 3279 stereo deck	64.95	49.90
FERGUSON 3280 Dolby stereo deck	89.95	67.50
H.L. CRTI stereo deck	79.95	59.50
GOODMANS SC0100 Dolby stereo deck	192.85	137.50
MARANTZ 5220 Dolby front load	266.91	221.50
MARANTZ 5420 Dolby	354.30	294.50
MARANTZ 5120 Dolby	260.62	217.50
PHILIPS N2511 Dolby, DNL stereo deck	149.00	114.90
PHILIPS N2412 stereo recorder inc. two loudspeakers	113.50	76.50
PIONEER CTF 2121 Dolby stereo front load	181.59	137.90
PIONEER CTF 6060 Dolby stereo front load	234.06	184.90
PIONEER CTF 7070 Dolby stereo front load	263.52	204.90
PIONEER CTF 8080 Dolby stereo deck front load	317.03	244.90
PIONEER CTF 9191 Dolby stereo front load	374.13	254.90
PIONEER CT 4141A Dolby stereo deck	135.82	97.50
PIONEER CT 5151 Dolby stereo deck	154.22	114.90
ROTEL RD 20 Dolby stereo deck	199.90	147.50
SANSUI SC 2000/2002 Dolby stereo deck front load	222.99	159.90
SANSUI SC 3000 Dolby stereo deck front load	250.09	179.90
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	Rec. Price	Our Price
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AKG D4 Microphone	6.19	4.25
AKG D5 Microphone	9.45	6.25
MARANTZ SUPERSCOPE IEC1	9.50	4.25
LUSTRE Pickup arm	41.46	21.90
SME 3009 Ser 11 Fixed Head Shell	56.70	39.90
SME S2 Head Shell	4.79	3.45

PLEASE NOTE:

There are no longer Recommended Retail Prices on some brands of Hi-Fi equipment, consequently some Recommended Prices shown are prices recommended prior to the end of September 1976. These are left for your information to assist you in evaluating your purchase.

CARDIFF	52 North Road, Cardiff	Tel: 0222 394016
CLEVEDON	4-9 Kimberley Road, (off Strode Road), Clevedon	Tel: 0272 876041
EDINBURGH	Annandale St. Lane, Edinburgh	Tel: 031-557 1004
GLASGOW	Anderston Cross Centre, Argyle Street, Glasgow	Tel: 041-204 2355
HULL	Status City, Clough Road, Hull	Tel: 0482 442134
LEICESTER	Rutland Centre, Yeoman Street, Leicester	Tel: 0533 536741
MANCHESTER	Marlborough Mill, Poplar Street, Failsworth	Tel: 061-682 6016
MANCHESTER	Kwik Save Centre, Past Tesco Hyper-Market, Fairhills Road, Irlam	Tel: 061-775 6666
NEWCASTLE	Saville Row, (off Northumberland Street), Newcastle	Tel: 0632 29896
NEWHAVEN	Avis Way, Newhaven	Tel: 07912 5081
SOUTHAMPTON	East Street Centre, East Street, Southampton	Tel: 0703 36944
SOUTHPORT	Kwik Save Centre, Fylde Road, Southport	Tel: 0704 20523
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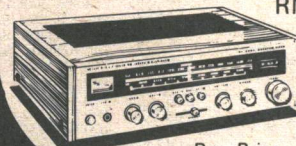
SAVE £66.60



MARANTZ

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AM/FM Stereo Receiver, 20 watts RMS per channel.



£93.50

LESS THAN 1/2 PRICE

Rec. Price £190.00

MARANTZ

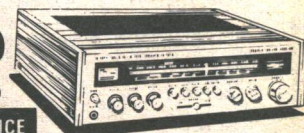
SUPERSCOPE R1270

AM/FM Stereo Receiver, 35 watts RMS per channel.

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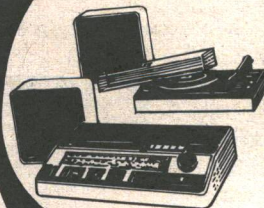


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RB740

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Akai AA2400	£127.40
Hitachi HA300	£78.50
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Howland West (Sp.off.)	£49.95
JVC 310 (Sp.off.)	£70.00
Korting 2 x 10W (Sp.off.)	£35.00
JVC (Other models)	P.O.A.
Leak 3900A	£285.00
Lux 130	P.O.A.
Lux 180/1100	S.A.E.
Lux CL350/C1000/M150/M200	PLEASE
Marantz 1030 (Sp.off.)	£79.00
Marantz 1060	£128.75
Marantz 1070	£154.75
Marantz 1150	£348.00
Marantz (All other models)	P.O.A.
Nikko TRM210 (Sp.off.)	£49.00
Quad 33 Pre-amp	PERSONAL
Quad 303	CALLERS ONLY
Quad 405	NO MAIL ORDER
NAD 60	£120.00
NAD 90	£148.50
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Rotel RA312	£62.95
Rotel RA412	£76.95
Rotel RA712	£94.25
Rotel RA812	£134.75
Rotel RA1312	£230.00
Rotel RA1412	£335.00
Sansui AU2900	£77.00
Sansui AU1900	£99.75
Sansui AU4900	£121.50
Sansui AU5900	£172.50
Sansui AU7900	£236.00
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Trio KA5500	£180.00
Trio KA7300	£230.65
Trio KA8300	£302.65
Trio 600	£527.65
Trio 700M	£522.00
Trio 700C	£355.50
Yamaha CA400	P.O.A.
Yamaha CA600	S.A.E.
Yamaha CA800	PLEASE
Yamaha CA1000	PLEASE

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(P & P £2.00)

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Akai AT2400	£126.75
Hitachi FT300	£73.25
Hitachi FT920	£130.50
Howland West 1100 (Sp.off.)	£40.00
JVC 310 (Sp.off.)	£74.00
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Sansui TU3900	£104.75
Sansui TU5900	£155.90
Sansui TU7900	£183.50
Sansui TU9900	P.O.A.
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Telefunken GT203 (Sp.off.)	£50.00
Trio KT1300	£73.15
Trio KT5300	£95.65
Trio KT7300	£183.35
Trio KT8300	£268.85
Trio 600T	£460.10
Trio 700T	£519.75
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Yamaha CT600	S.A.E.
Yamaha CT800	PLEASE
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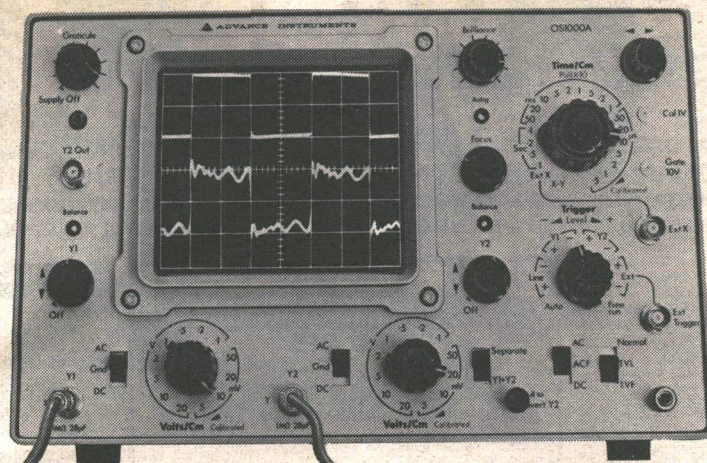
Speaker Demonstration

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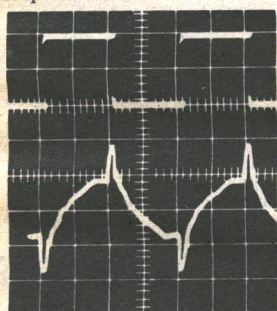
01-429 1650



Listen to this!

This is an oscillograph of a square wave signal **AFTER** it has been through one of our linear-phase loudspeakers. You can see at a glance that the waveform is clean and almost perfect — and that should be enough to convince you that the speaker on test is worth listening to.

Most modern loudspeakers have a wide frequency response and are virtually free of harmonic distortion, but how many of them can do this kind of justice to a square wave? Chances are that if yours were put to the same test, the oscillograph would look like this — a typical 'good quality' loudspeaker trace.



The degradation of the square wave input is caused by phase distortion in the loudspeaker. And what you see on the screen you also hear in normal musical reproduction.

What is phase distortion?

It is a distortion in time — a delay between different sections of the frequency spectrum. It occurs in any multi-unit speaker and is caused by the phase changes which develop in the crossover networks. As it is in the nature of a capacitance to advance the current in relation to the voltage, and in the nature of an inductance to delay it, the capacitor-dominated circuit which filters the high frequencies to the treble driver will advance the waveform by 180° in relation to that of the lower frequencies which are filtered by an inductance-dominated circuit to the bass driver. The audible effect thus created is that the music seems to stay 'inside the box'; it lacks presence and definition and the individual instruments are difficult to locate. A simple method of

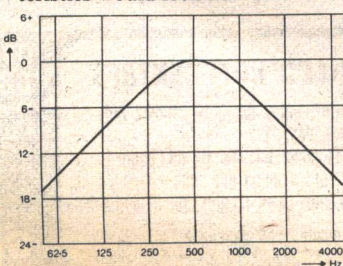
equalising this time-lag would be to reverse the polarity of one of the drivers, but of course this creates an audible drop in amplitude at the crossover frequency through the mutual cancellation of the two units. It is therefore not a viable solution.

How did Bang & Olufsen overcome phase distortion?

When the causes of phase distortion originate in the natural laws of physics, how is it possible that Bang & Olufsen has found a way to eliminate it? Obviously we couldn't change nature, so we spent four years trying to minimise its effect.

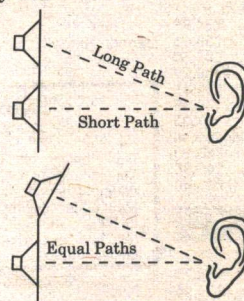
The concept of phase-linearity in speakers is not new, but all previous designs involved the use of complex active components so the resulting products were so costly that only professional recordists and studios could afford them. Our aim was to produce a domesticated loudspeaker that would match this phase-linear performance but still remain within reach of every audio enthusiast.

First we had to invent methods for identifying and measuring phase distortion. Once we could differentiate between this and all the other types of distortion and imperfection inherent in loudspeaker design, we set about reducing the whole problem to mathematical terms. With the help of our NASA computer terminal, we discovered that the phenomenon called phase distortion was directly related to a 'missing factor', and this factor had a value exactly equivalent to a drive unit with a peak at the crossover frequency and attenuated 6dB/Oct on both sides of this frequency. In other words, we needed to add a 'filler-driver' whose performance characteristics would look like this.



The addition of this filler-driver (registered by Bang & Olufsen under the name Phase-Link®) plus a completely re-designed crossover network and some physical rearrangement of the conventional drive units, resulted in the first Beovox Uni-Phase loudspeaker.

Why do Beovox Uni-Phase loudspeakers look the way they do?

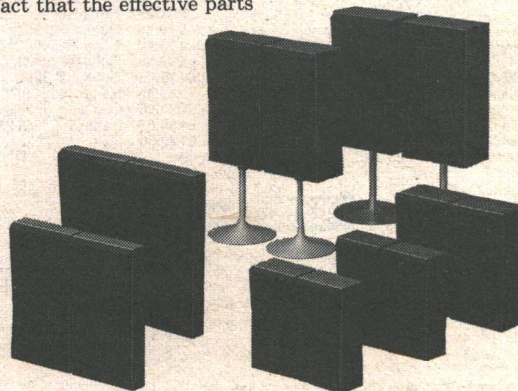


There is a further reason why the bass tones tend to be delayed in relation to the high ones. This is a delay in arrival time caused by the simple fact that the effective parts

of the deeply-dished woofer are usually farther away from the listener's ear than those of the small, shallow tweeter. We have minimised this problem by mounting the units on an inclined vertical plane so that they share a common acoustical axis and have equal paths to the ear.

That's why Beovox Uni-Phase speakers have an angled front profile. The cabinets are made of a high density polyurethane foam resin which has better acoustic properties than wood, so we have been able to maintain a wide frequency range and good transient response while reducing the physical size of the enclosures.

There are seven models to choose from. Power handling ranges from 22 to 70 watts RMS and impedance is 4-8ohms throughout. So most high quality systems can now enjoy the advantage of phase-linear speakers which cost no more than conventional ones. All authorised Bang & Olufsen dealers offer comparative demonstrations — so if our oscillographs haven't fully convinced you, let your own ears furnish the proof.



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Akai AA1030	£219.65
Akai AA1050	£219.65
Amstrad 5000	£68.05
Amstrad 5050	£79.30
Armstrong	P.O.A.
B & O	F.R.A.
Goodmans Mod.90	£124.25
Goodmans 1-20	£140.95
Goodmans 150	£205.80
Harmon Kardon	F.R.A.
J.V.C.	F.R.A.
Leak 3200	£160.95
Leak 3400	£201.70
Pioneer SX.450	£111.25
Pioneer SX.550	£137.50
Pioneer SX.650	£193.00
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Rotel RX.152 II	£85.60
Rotel RX.202 II	£94.55
Rotel RX.402	£132.35
Rotel RX.602	£168.10
Rotel RX.802	£211.40
Rotel RX.1603	£429.70
Rotel RX.7707	£183.90
Sansui 221	£89.20
Sansui 331	£99.10
Sansui 551	£129.50
Sansui 661	£165.95
Sansui 771	£205.95
Sansui 881	£266.50
Sony, Tandberg, Technics,	
Toshiba, Trio	F.R.A.

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Trio KR.3400 (B)	£125.50
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Mk.III	£39.15
Amstrad IC.8000	£26.45
Mk.III	£26.45
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Rotel RA.412	£75.55
Rotel RA.712	£92.45
Rotel RA.812	£132.35
Rotel RA.1312	£223.45
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Sansui AU.2900	£68.20
Sansui AU.3900	£88.55
Sansui AU.4900	£107.35
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Sony, Tandberg, Technics,	
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Technics SU.7200	£69.95
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B & O	F.R.A.
J.V.C.	P.O.A.
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Pioneer TX.9500	£186.30
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Rotel RT.324	£70.45
Rotel RT.624	£103.10
Rotel RT.724	£82.45
Rotel RT.824	£130.55
Rotel RT.1024	£223.45
Sansui TU.3900	£94.10
Sansui TU.5900	£138.55
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Sony, Technics, Toshiba,	
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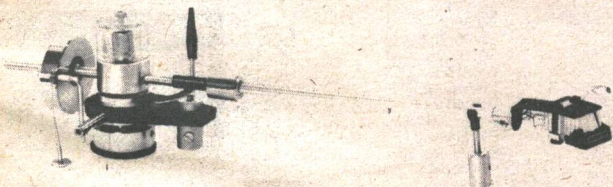
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(Sp. off.) £144.00
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LS550 £359.00
Hitachi MC3402 £130.50
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JVC 1845 excluding speakers £200.00
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All prices per pair (P/P on application)
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Chartwell PM400 P.O.A.
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Pageant Series 2 P.O.A.
Quad Electrostatic P.O.A.
Rogers LS3/5A P.O.A.
Spendor BC1, BC2, BC3 and Mini
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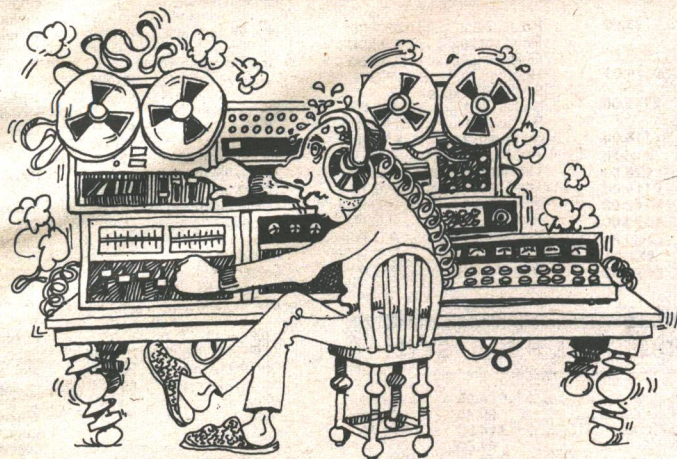
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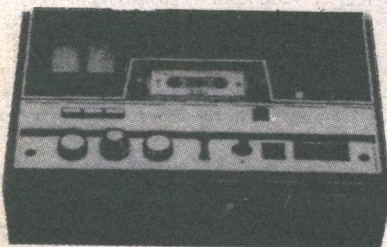
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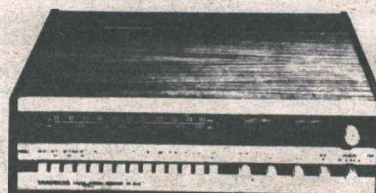
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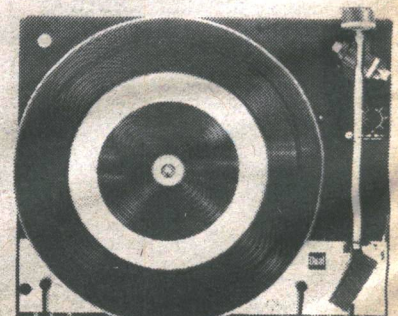
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The TAPE SPECIALISTS

Clip this coupon/advert and send it (or bring with you) when you order. In exchange, we will supply you at these "ultra-special" prices. (Offer subject to availability; price increases/printers' errors excepted!)

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84min 85p	MrX2	C60 1.09	AMPEX 20/20
AMPEX	C30 54p	TDK	7" 1800' LP £2.94
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20/20+ Studio	C60 67p	C45 44p	
42min 1.01	C90 82p	C60 49p	MAXELL UD (Matt Back)
84min 1.25	C120 1.25	C90 69p	7" 1800' LP £3.43*10 1/2"
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C90 56p	C90 1.08	C45 49p	MEMOREX
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C60 49p	SCOTCH DYN	C60 91p	5" 1200' DP £2.10
C90 64p	C60 51p	C90 1.24	7" 2400' DP £3.45
C120 86p	C90 65p	TDK SA	TDK AUDUA
BASF LH	C120 91p	C60 93p	7" 1800' LP £2.65
BASF SUPER		C90 1.29	10 1/2" 3600' LP NAB £8.35*
BASF Cr02			

Please phone for current prices

*EXTRA SPECIAL OFFER

All offers subject to availability. ADVERT CLOSING 31/12/76.

Prices correct at 18.10.76 and include VAT but are subject to change without notice. Cash with order. P & P 1p every cassette; 10p every reel of tape. MINIMUM p & p 75p on all orders except Maxell, Memorex and Sony (MINIMUM 35p).

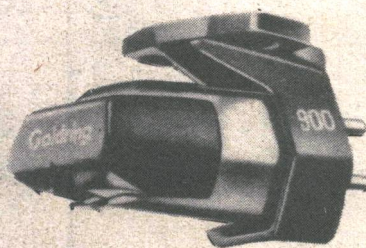
**ESTUARY
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113 RECTORY GROVE,
LEIGH ON SEA (0702 712861)

G900 Super E. Another Great British Cartridge from Goldring.



The lighter the cartridge, the better the sound quality. At less than 5 gms. cartridges don't come much lighter or better than the amazing new Goldring G900 Super E.

By the use of a micro-miniature magnet to a specification previously believed impossible, plus advanced new magnetic circuitry and coil winding techniques, Goldring have created in the G900 SE an extraordinarily low mass cartridge with very flat frequency response and excellent tone burst response.

The result speaks for itself. In a clear, firm voice.

Goldring

Sound pure and simple.

Anglian Lane, Bury St. Edmunds IP32 6SS.
For further details ring: 0284 64011.

Many of you will have read the various comparative reviews printed in this and other Hi-Fi magazines. Perhaps you too have found amusing in them the increasing use of the word 'subjective', because it wasn't very long ago when the results of objective test procedures formed the basis of equipment recommendations. You may also remember that it was one of our fellow dealers who really put the cat amongst the pigeons by stating in his advert that a

certain very well measured amplifier sounded 'foul'! What a controversy that caused!!

The outcome is plain to see — the word 'subjective', now being used in almost every equipment review, proves that the human ear *must* be the final judge in assessing the performance of any audio component.

Unfortunately old habits die hard and it is still too easy to be impressed by the written word, words

which really tell us so little about the actual sound. At Hi-Fi Consultants we have created a stylish listening environment where you can compare everything from cartridges to loudspeakers. We carry good stocks and keep our prices comparable with the lowest advertised.

So come and listen — you can't blame your ears if you don't!

13, Whitshed Street, Peterborough. Telephone (0733) 51007

What have you heard with your eyes recently?



Probably the most unnecessarily controversial topic of the moment is turntable drive mechanisms — belt or direct. We have them all in stock: Linn Sondek, Technics, Pioneer, Sansui and Harmon Kardon Rabco are just a few currently connected to our comparator. They ALL have their merits!

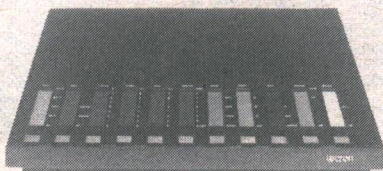


The new LUX PD131 direct drive makes no sound at all — it just screams Q-U-A-L-I-T-Y! It is one of a very few select items to earn the highest regard of both audiophiles and engineers. Expensive? Yes, but if you're coming a long way for it we can certainly make it worth your while.



We are currently considering a number of moving coil cartridges and Yamaha of course have an appropriate input on their CA1000 amplifier to accept the very low output of these units without transformers. We must mention Sugden for very pleasant sound quality as well as Technics and Pioneer for superb value for money — especially at our prices!

lecson

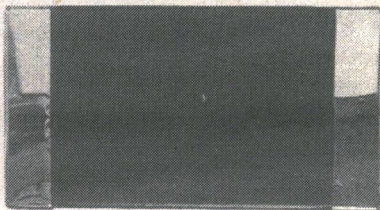


We use Lecson at home — all of us! Our present domestic set-ups include ESL's, Gales and Yamaha NS1000's, all being driven by Lecsons. What more need we say about this truly beautiful equipment — we put our own money on this one!

Very keen prices on both combinations.



Gale



Gale speakers stand comparison with anything on the market. We have installed them for classical music lovers and rock fans. They sound very accurate without being sterile, smooth but not lifeless and run loud quite tirelessly.

Recommended for amplifiers of 40 — 200w, the GS401A and B (wooden finish) are guaranteed for 7 years and at our prices are probably the most under-priced units in the country. Value for money takes on a new meaning!!

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Bring your ears!



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GX 265D	£299.50

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GXC 39D	£141.95
CS 707D	£157.00
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Plus SME 3009	£126.00
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44	£170.00
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GT 55	£103.25
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86SB Mk II	£67.25
SP25	£37.80

J.V.C.

Receivers	
VR 5505L	£83.50
JRS 100	£115.00
JRS 200L	£203.50

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JAS 31	£107.00
JAS 11	£74.00

Tuners	
JTV 6	£117.00
JTV 31	£85.00

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JLA 15	£59.50
JLA 1	£55.00

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CD 1667 Mk II ANRS	£107.00
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4DTX1 Shibata	£31.50
4DT20X	£18.65
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HV 2	£19.95
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Phase 2	£45.75
Technician VFR	£43.95

PIONEER

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SA 7300	£124.00
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SA 5300	£65.50

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TX 7500	£144.50
TX 5300	£73.50

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SX 750	£247.00
SX 650	£207.00
SX 550	£147.50
SX 300	£80.00

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RA 312	£65.50
RA 412	£79.50
RA 612	£109.25
RA 812	£140.00
RA1312	£241.80

Tuners	
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RT 324	£74.75
RT 624	£109.50
RT 724	£87.50

Receivers	
RX 102 MkII	£79.00
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RX 602	£179.50
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RICHARD ALLAN

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RA 82	£87.25
RA 82L*	£104.50
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Triple 8*	£41.50
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Super Triple 12	£59.75
RA 8	£38.00
RA 82	£61.75
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TD 160 C	£79.75
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TD 160 II BC	£82.00
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Walnut Finish 2½% extra	

Kits	
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Denton 2XP*	£23.75
Linton 3XP	£35.50
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M44-7	£7.35
M44-E	£7.77
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M75-B	£11.11
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M75-ED	£16.30
M95-EJ	£14.21
M95-ED	£20.65
M24-H	£27.16
V15-E3	£48.78
Stanton 681EEE	£47.25
680EEE	£30.50
500EE	£20.25
500E	£17.50
Golding G820	£8.55
G820E	£12.26
G820SE	£17.16
G900	£32.50

J.V.C. See under JVC Cartridge price includes the Stylus. All genuine items in makers box.

STYLI

Shure N3-D	£4.02
N44-7	£5.20
N44-E	£5.80
N55-E	£6.79
N75-B	£6.55
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N75-ED	£12.06
N95-EJ	£9.55
N95-ED	£16.37
VN35-E	£17.83
VN15-E (2)	£16.95
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N75-3 (78)	£5.90
N95-3 (78)	£5.90
VN78 (78)	£16.95
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D6800EE	£21.75
D5100EE	£13.95
D5100E	£11.50
Golding D130	£3.43
D130E	£7.14
D130SE	£10.97
D120SR	£2.81
D110SR	£3.37
D110E	£7.09
D110SE	£11.92
D110 120 (Std) 78	£3.37

MAIL ORDER: Please add carriage & insurance as follows. Amps, Receivers, Decks etc. £2.50. Speakers: £3.50. Items marked* £6.00. Headphones & mics 75p. Cartridges & Styli 25p (Mainland only). Prices include VAT. We reserve the right to amend prices without notice. E & OE

IMPORTANT NOTICE

Due to the present currency problems we expect many of the prices in this advertisement will have been increased by the manufacturers before this magazine is published. We regret any inconvenience this may cause, but we will be pleased to quote where such changes have occurred. It is our policy to maintain present prices as long as stocks last.

Thank you for your co-operation and understanding of a situation that is beyond our control.

Prices on Application for
ARMSTRONG, BOWERS & WILKINS FONS,
FORMULA 4, KEF, NAKAMICH, QUAD,
TANDBERG, SME, TANNY, TECHNICS,
YAMAHA.

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UD	£0.99	£1.14	£1.30	£4.77
UDXL		£1.30	£1.63	
Super LN		£0.63	£0.82	£1.03
TDK D	£0.56	£0.65	£0.90	£1.15
SD		£0.82	£1.15	£1.60
ED	£0.80	£1.00	£1.50	
SA		£1.15	£1.65	
KR		£1.00	£1.50	
TDK Audia		£1.12	£1.60	
BASF LH		£0.58	£0.78	£1.07
Super		£0.85	£1.13	£1.49
Cr02		£1.13	£1.43	£1.90
FeCr		£1.43	£1.90	
Sony K		£0.60	£0.80	£1.10
Cr02		£1.23	£1.56	

*Limited stock.
Post 15p per Cass. — 30p per 5 Cass. — 45p per 10 Cass.

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TEL: 01-272 7901

Revox AX5-4 100 Watt Loudspeaker

The new AX 5-4 100 watt loudspeaker from Revox is the latest addition to the superbly engineered AX range, embodying the latest concepts in loudspeaker design.

Specially designed twin high power woofers provide sensitive distortion-free performance at lower frequencies. Proven dome-type mid-range and tweeter speakers extend this performance right up to the highest frequencies.

Other models in the Revox AX range include the 30 watt AX 2-2, the 40 watt AX 3-3 and the 60 watt AX 4-3 (all power ratings to DIN 45-500).

Call at your Revox dealer for a demonstration and let your ears be the judge of Revox performance. Or send the coupon for full specifications of the AX loudspeaker range.



Please send me literature on the Revox AX loudspeaker range and other Revox Hi-Fi products.

Name _____

Address _____

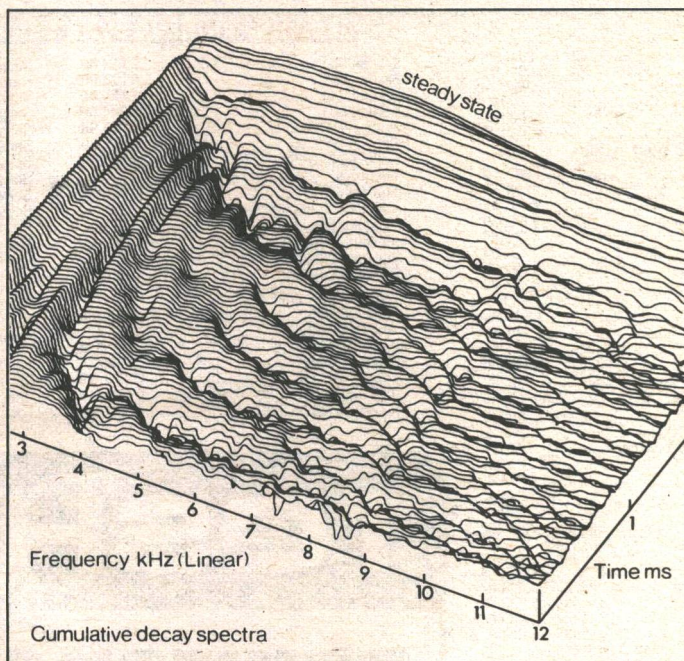
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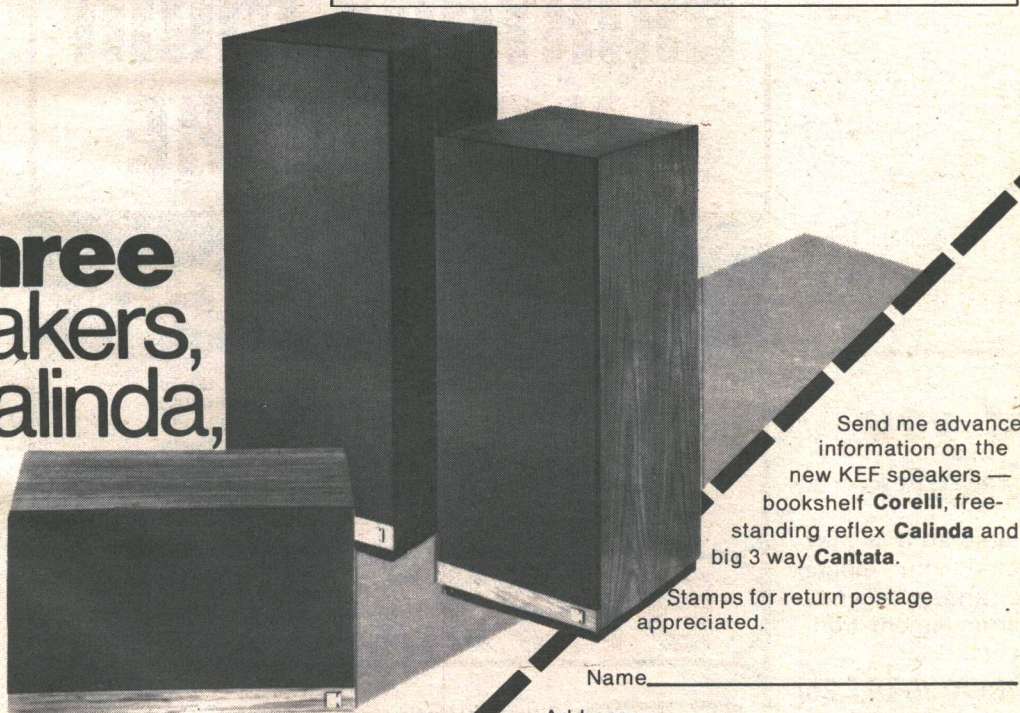
KEF gain a new dimension

KEF engineers today are working with radically new techniques. Their computer-based analysis gives them a deeper insight, a more precise three-dimensional vision of speaker performance than was previously possible. They knew that KEF drive units, with their advanced laminated diaphragms, offered a high level of performance. So research looked even harder at the equally vital dividing networks, at cabinet construction and power handling capability. Yesterday's 'try it and see' methods were too imprecise — but the new KEF techniques revealed more. Enclosure materials were studied by impulse response, and network designs refined to get precisely the right response shape from each drive unit.

Applied to *your* speaker needs, the KEF programme has created three important new systems. You will be getting to know them well — Corelli, Calinda and Cantata. A 2 way shelf-mounting system, 3 way reflex free-standing enclosure, and larger 3 way system handling 150 watts. All three have the new computer-designed filter circuits. You can *clearly* hear the difference — better transient response, lower coloration. All three have redesigned cabinets, weighty with high-density internal damping laminations. All three handle today's power amplifier outputs with confidence and lower distortion. New speakers from KEF always make headlines. Watch for the reviews.



Result: **three**
new speakers,
Corelli, Calinda,
Cantata.



Send me advance information on the new KEF speakers — bookshelf **Corelli**, free-standing reflex **Calinda** and big 3 way **Cantata**.

Stamps for return postage appreciated.

Name _____

Address _____

KEF the speaker engineers



KEF Electronics Limited
Tovil Maidstone ME15 6QP Kent
Telephone 0622 57258 Telex 96140

HFP 12/76

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JVC New Range	P.O.A.
Quad 33/303	P.O.A.
Quad 33/405	P.O.A.

Rotel ring for best prices

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Sony TA88	£55.95
Sony TA 1630	£77.95
Sony TA2650	£99.95
Sony TA3650	£139.95
Sony TA5650	£207.95
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Yamaha CA1000	P.O.A.

TUNERS

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Rotel ring for best prices

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Technics ST3500	P.O.A.
Technics ST7200	P.O.A.
Technics ST7600	P.O.A.
Technics ST8600	P.O.A.
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Trio KT7300	£179.50
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Yamaha CT600	P.O.A.
Yamaha CT800	P.O.A.

RECEIVERS

Alba UA1500	£86.25
Armstrong 625	P.O.A.
Armstrong 626	P.O.A.
Rotel RX202	£95.95
Rotel RX402	£132.00
Sansui 331	£109.00

Sansui 551	£142.50
Sansui 661	£183.00
Sansui 771	£225.00
Sansui 881	£294.00
Sony STR7015	£119.95
Sony STR7025	£139.50
Sony STR7055A	£184.95
Technics — New range in stock	
Trio Receivers	P.O.A.
Toshiba — exciting range in stock	
Yamaha CR200	P.O.A.
Yamaha CR450	P.O.A.
Yamaha CR600	P.O.A.
Yamaha CR800	P.O.A.

CASSETTE DECKS

Alwa AD1300	£142.95
Alwa AD1600	£194.20
Alwa AD1800	£229.95
Alwa AD6500	£199.95
Dual C901	£229.95
JVC CD1950 (Special offer)	£129.95
National RS260US	£57.95

National RS269UA	£87.95
Neal 102/103	P.O.A.
Sansui SC636	£112.50
Sansui SC737	£137.00
Sansui SC2000/2	£159.00
Sansui SC3000/3	£178.00
Sony TC135SD	£109.95
Sony TC186SD	£129.50
Sony TC204SD	£142.95
Sony TC206SD	£161.50
Technics RS263AUSD	P.O.A.
Technics RS273US	P.O.A.
Technics RS640US	P.O.A.
Technics RS6300AUS	P.O.A.
Technics RS671US	P.O.A.
Trio Decks	P.O.A.
Toshiba — new range in stock	
Yamaha TC800GI	P.O.A.

TAPE DECKS

Sony TC377	£162.50
Sony TC645	£244.50
Toshiba PT862	£124.95

MUSIC CENTRES

Aiwa AF5080	P.O.A.
National SG1020L	£139.95
National SG1060L	£186.95
National SG1070L	£193.50
National SG2070L	£245.95
Sony HMK20 (Special offer)	£129.95
Sony — all models at discount	
Toshiba — new range in stock	

TURNTABLES

Dual CS1225/1	£75.50
Dual CS601	£122.95
Dual CS701	£189.95
Dual CS510	£102.95
Rotel RP1500	£63.95
Sansui Decks	P.O.A.
Rotel RP 2500 (Special offer)	£68.95

SONY DECKS AT DISCOUNT

Technics SL20	P.O.A.
Technics SL23	P.O.A.
Technics SL1400	P.O.A.
Technics SL1500	P.O.A.
Technics SL120	P.O.A.
Trio KP1022	£54.95

LOUDSPEAKERS (PAIRS)

AR Range	P.O.A.
Celestion Range	P.O.A.
JR 149	P.O.A.
JBL range available	
KEF Coda	P.O.A.
KEF Cantor	P.O.A.
KEF 103	P.O.A.
KEF 104	P.O.A.
KEF Corelli	P.O.A.
KEF Calinda	P.O.A.
KEF Cantata	P.O.A.
KEF Kit 1	£49.95
KEF Kit 3	P.O.A.
KLH Range	P.O.A.
Monitor Audio Range	P.O.A.
Wharfedale Range	P.O.A.
Tannoy Devon	P.O.A.
Tannoy Cheviot	P.O.A.
Technics Range	P.O.A.
Videotone Minimax II	£39.95
Videotone Saphir I	P.O.A.
W.A.R. 2020	£76.95
W.A.R. 3535	£124.95

We cannot show all makes or models available or all prices so please call us for up-to-date information.

TOSHIBA

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N Technics

Shure, ADC and Stanton cartridges stocked, tapes, cassettes, SME arms and headshells stocked. Range of mono & stereo mikes, connecting leads, headphones, plugs and accessories. Colour television, short wave radio cassettes. Export TV & Hi-Fi. Metrosound accessories. Vac-O-Rec record cleaners. Modus Hi-Fi furniture. Micro-Acoustics cartridges.

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- ... Are happy to service most leading makes of equipment.

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Superfi brings to Nottingham a brand new Hi-Fi store that offers you the finest in Hi-Fi equipment, service and product knowledge anywhere in the Midlands.

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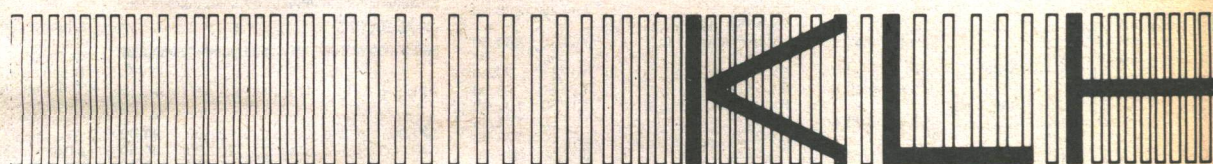
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Tomorrow's Choice



New from KLH Research and Development Corporation is their range of loudspeakers which improves still further on our reputation for outstanding quality and performance.

An exciting event for a Company whose earliest models are still rated among the best in the world – the legendary KLH9, for instance, 15 years after its introduction is still rated "the best attainable sound" by the American Stereophile magazine.

In bringing out this new range we are taking advantage of a number of recent technological breakthroughs to put the KLH owner yet another 15 years ahead. In many models we have used drive units which are unique to KLH, and the subject of over twenty distinct claims under different United States patents. Our Megaflux Woofer and the DVR Tweeter are just two examples of such technological achievements.

Small wonder, that KLH should remain the choice of the music lover and the professional alike. Be it the bookshelf KLH 331 or the overwhelming KLH SCX3, you are assured of the most accurate musical reproduction.

Model No.	Rec. retail price per pr. inc. VAT	Model No.	Rec. retail price per pr. inc. VAT
331	£107.00	CL4	£377.00
317	£157.00	355	£587.00
CB8	£187.00	SCX3	£898.88
363	£247.00	9	£2,350.00
354	£327.00		

Webland International Mirabel House 117/121 Wandsworth Bridge Road London SW6 2NA
Telephone: 01 736 0987/8/9/0 Telex: 25570

*All prices per pair inclusive of V.A.T.

COMET

	Rec. Retail Price Inc. VAT	Comet Price Inc. VAT
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Stereo Amplifiers

ALBA		
UA 700A	69.00	49.50
UA 900	107.95	76.90
AMSTRAD		
8000 Mk 3	37.96	29.90
IC 2000 Mk 3	56.25	43.90
FERROGRAPH		
F208 Mk II	121.50	89.90
F608 Mk II	209.25	149.90
GOODMANS		
Model 40-40	111.02	64.90
MARANTZ		
1030	99.83	82.90
1040	161.97	134.90
1060	167.06	138.90
1200B	518.83	299.90
1070	202.73	168.90
1150	369.79	306.90
1150D	460.46	381.90
3800 Pre amp	723.29	599.90
510 M Pow. amp	990.18	820.90
3200 Pre Amp	179.29	148.90
140 Pow. Amp	268.94	222.90
PIONEER		
SA 5300	85.86	69.90
SA 6300	105.71	86.90
SA 7300	162.62	129.90
SA 7500	238.14	189.90
SA 8500	271.22	214.90
SA 9500	363.80	289.90
SA 9900	539.80	425.90
ROTEL		
RA212	73.50	57.90
RA312	89.90	69.90
RA412	109.90	85.90
RA612	149.90	99.90
RA712	134.61	104.90
RA812	192.50	154.90
RA1312	325.00	254.90
RA1412	425.00	329.90
SANSUI		
AU 2900	105.47	77.90
AU 3900	137.00	101.90
AU 4900	166.03	124.50
AU 5900	236.06	176.90
AU 7900	323.43	241.90
SOLAVOX		
20, 10 watts. RMS per channel	45.53	28.50
30, 15 watts. RMS per channel	53.46	32.50

Tuners

ALBA		
800A	75.00	52.50
AMSTRAD		
3000 Mk II	56.25	44.90
FERROGRAPH		
SFM 1 Mk II	147.38	107.90
MARANTZ		
104	135.82	112.90
112	194.87	161.90
150	466.56	386.90
PIONEER		
TX5300	96.40	79.90
TX7500	189.42	139.90
TX9500	261.87	189.90
ROTEL		
RT224	79.90	59.90
RT324	102.50	79.90
RT624	149.90	89.90
RT724	119.90	93.90
RT824	189.90	149.90
SANSUI		
TU3900	145.47	108.90
TU5900	214.37	159.90
TU7900	251.54	187.90

Tuner/Amplifiers

ALBA		
1500	115.00	79.90
AMSTRAD		
5050	113.94	85.90
AKAI		
AA 1010	159.50	122.90
AA 1020	219.50	164.90
AA 1030	245.00	184.90
AA 1050	319.50	239.90
FERGUSON		
3491. Stereo FM 2/4 channel Tuner Amplifier with SQ Decoder, Pan balance control 4 meters 4 x 14 watts output	189.30	79.90

Tuner/Amps continued

GOODMANS		
110 Compact inc. turntable	—	139.90
Module 90 Teak	177.86	129.90
Module 120	201.75	149.90
Module 150	294.64	199.90
MARANTZ		
4240	458.42	239.90
4400	916.83	759.90
2325	696.80	577.90
2275	603.90	499.90
2250B	486.44	403.50
2235B	373.30	309.50
2225	234.81	194.90
2215B	160.95	133.50
SUPERSCOPE R1240	190.00	94.90
SUPERSCOPE R1270	220.00	109.90

PHILIPS

RH832 System, AM/FM/MPX Stereo tuner and pre-amplifier, turntable combination inc. two Philips RH 532		
Motional feedback loudspeakers, 60 watts RMS per channel output	715.50	495.00

RH743 AM/FM/MPX tuner pre-amplifier for use with RH541 or RH544 MFB speakers	170.00	124.50
RH831 AM/FM/MPX tuner amp. with built in stereo Dolby cassette deck	449.10	394.90

RH851 AM/FM/MPX tuner amp. stereo cassette deck, DNL with two speakers	249.00	169.90
RH752 Electronic search tuning	260.00	197.90

PIONEER

SX 300	104.90	79.90
SX 450	156.33	124.90
SX 550	193.26	154.90
SX 650	271.26	219.90
SX 750	322.80	259.90
SX 850	430.45	339.90
SX 950	494.20	389.90
SX 1250, 160 watts RMS per channel	757.80	589.90

ROTEL

RX 102 Mk. 2	107.50	79.90
RX 152 Mk. 2	124.50	89.90
RX 202 Mk. 2	137.50	104.90
RX 402	192.50	144.90
RX 602	244.50	174.90
RX 802	307.50	219.90

SANSUI

221	137.98	99.90
221	153.35	114.90
551	200.36	149.90
661	256.79	189.90
881	412.29	308.90
8080	520.81	389.90
9090	572.66	428.90
QRX 7001 QS CD4	706.08	528.90

Turntables

AKAI		
AP001 inc. B & C	87.00	67.90
AMSTRAD		
TP12D inc. B and C	57.85	44.90
CONNOISSEUR		
BD1 kit	16.76	13.90
BD2A/P & C/SAU2	54.56	44.90
BD3 inc. B & C	95.63	74.25
GARRARD		
SP25 Mk IV Chass.	29.81	20.90
DD75 Direct Drive inc. B & C	122.06	84.90
401 Chass	81.51	54.90

GOLDRING		
L80PC inc. B & C	78.75	58.90
L82PC Auto stop inc. B & C	90.00	67.90
L84PC Auto return inc. B & C	106.88	78.90
L90PC Electronic Auto stop inc. B & C	166.50	123.90

MARANTZ		
6300 inc P & C	221.06	183.50
6320 inc P & C	174.22	144.50
6200 inc P & C	175.22	145.50
6100 inc P & C	106.35	64.90
McDONALD		
MP60 Chass	23.74	15.90

PIONEER		
PL112D	80.76	63.90
PL115D	90.02	73.90
PL117D	133.49	109.90
PL510A Direct Drive	159.71	129.90

Turntables continued

ROTEL		
RP1500 with b and c and arm	91.50	72.50
RP3000 less arm with b and c direct drive	124.50	97.50
RP3000 with arm with b and c direct drive	149.90	117.50

SANSUI

SR222P inc. b and c belt drive	89.66	66.50
FR1080P inc. b and c belt drive auto return	111.61	82.90
SR525 Direct Drive inc. b and c	180.44	134.90
FR5080P Direct Drive auto return inc. b and c	251.33	187.90

THE FOLLOWING TURNTABLES ARE COMPLETE WITH BASE, PLINTH, COVER AND CARTRIDGE. FULLY WIRED AND READY FOR USE.

ADC

Accutracer 4000 Auto, computer	287.10	264.90
AKAI		
AP 003 with Audio Technica AT11, magnetic cartridge, auto return	141.50	79.90

GARRARD

SP25 Mk. IV with Shure M75/6/SM	53.61	36.90
125SB with Shure M75/6/SM	69.19	45.90
86SB Mk. II with Shure M75/6/SM	95.23	66.90

McDONALD

GT55P with Shure M75ED	146.19	99.90
MP60 TPD with ADC K8	44.36	29.90
BDS 80 TPD Belt Drive with ADC K7E	57.33	37.90
BDS 90 TPD Belt Drive with ADC K5E	63.16	42.90
BDS95 TPD Belt Drive with ADC K5E	65.21	44.90

Speakers

ALL SPEAKERS ARE PRICED AS PAIRS

AKAI		
SA800	121.00	84.90
SA1000	207.00	99.90
SA1200	258.00	129.90
ALBA		
300	36.95	23.90
AMSTRAD		
Acousta 2500	51.61	39.90

CELESTION

Hadleigh	Sp. price	35.90
Ditton 11	77.95	56.90
Ditton 15	124.15	88.90
Ditton 25	262.53	188.90
Ditton 33	190.57	135.90
Ditton 44	227.06	163.90
Ditton 66	374.58	269.90

FERROGRAPH

GOODMANS		
Achromat 100 Monitor	110.82	69.90
Achromat 250 Monitor	162.78	104.90
Achromat 400 Monitor	214.38	129.90
Stand for 400 (pair)	21.29	14.90
RB18	72.30	49.90
RB20	92.40	64.90
RB35	132.58	89.90

LEAK

2075	473.40	368.90
3020	119.42	89.90
3030	157.50	119.50
3050	218.00	164.90
3080	333.96	249.90

MARANTZ

4G	102.69	63.90
5G	145.69	119.90
HD44	147.74	122.50
HD55	203.74	168.90
HD66	289.31	239.90
HD77	415.62	344.90
HD88	599.00	496.90

PHILIPS

RH541 Motional feedback (MFB) built in 30 watts RMS amps	189.00	169.50
RH544 (MFB) 60 watts	297.00	259.50
PIONEER		
CST 61	203.54	119.90
CST 8	540.41	299.90
CS313A	78.37	59.90
HPM 40	186.12	149.90
HPM 60E	252.86	194.90
HPM 100	387.54	294.00

SANSUI

ES200	212.04	159.00
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Speakers continued

SOLAVOX		
TK20	50.29	34.90
TK30	64.71	45.90
TK45	120.06	89.90
Speaker stands (pair)	16.99	12.50
WHARFEDALE		
Chevin	40.12	29.90
Denton 2XP	59.15	43.90
Linton 3XP	84.62	61.90
Glendale 3XP	115.16	89.90
Dovedale SP	197.24	144.90
Airedale SP	320.40	239.90

Speaker Kits

GOODMANS		
DIN 20 NT kit (pair)	41.32	28.90
Mezzo twin kit (pair)	72.49	49.90
WHARFEDALE		
Linton kit (pair)	30.11	23.50
Glendale 3XP kit (pair)	66.89	49.90
Dovedale kit (pair)	85.95	63.90

Chassis Speakers

PRICED AS SINGLE UNITS

GOODMANS		
Audium 12P	22.48	15.90
Audium 12PG	24.36	16.90
Audium 12PD	25.69	17.50
Axent 100	10.84	7.50
Hi Fax 750P	23.88	16.75

Cartridges

All cartridges marked * are suitable for CD4 and normal Stereo Records.

AUDIO

Technica AT13EA	14.30	11.90
*Technica AT12S	21.02	17.50
*Technica AT14Sa	28.72	23.90
*Technica AT15Sa	41.67	34.90
*Technica AT20SLa	46.61	37.90

ADC

*Super XLM	54.70	36.90
XLM	38.68	26.90
VLM	31.40	21.90
Q36	18.45	12.90
Q32	14.27	9.90
Q30	10.45	7.75

GOLDRING

G800 Boxed	8.44	4.25
G800E Boxed	12.83	6.25
G800 Super E Boxed	19.58	9.75
G900 Super E	40.50	29.75

PHILIPS

GP 400	24.14	8.90
GP 401	32.06	11.90
GP 412	51.38	29.90
GP 422	69.19	45.00

I promise you 12 months service, including parts and labour on all goods – without charge. After the initial free 12 month period you can still rely on us to ensure that your purchases are kept in working order.

Michael Hollinger
Chairman

	Rec. Retail Price Inc. VAT	Comet Price Inc. VAT
Bases and Covers		
AKAI		
DC 44 for 4000 DS	8.80	6.50
CONNOISSEUR		
BD1 plinth & cover	16.88	13.00
GARRARD		
B15 Base and Cover SP25	17.16	12.50
B20 Base and Cover 86SB, 100SB	20.70	14.90

Hi-Fi Tape Recorders

AKAI		
4000 DS Mk. II stereo deck	174.00	134.90
4000 DB Dolby stereo deck	249.50	189.90
GX265D stereo reverse deck	411.00	319.90
FERROGRAPH		
7502D 2-track Dolby stereo deck	478.13	379.90
7504D 4-track Dolby stereo deck	478.13	379.90
FERROGRAPH Logic Seven		
7602 High Speed	534.38	434.90
7602 Dolby High Speed	630.00	549.90
7604 Dolby High Speed	630.00	549.90
7622 Dolby High Speed	691.88	599.90
7624 Dolby High Speed	691.88	599.90
PHILIPS		
N4504 4 track DNL stereo deck	202.50	154.90
N4506 4 track DNL Pro- fessional stereo deck	320.00	259.90
PIONEER		
RT 2044 Professional 4 channel	1,549.92	1,175.00
SOLAVOX		
7 in Metal spool	Sp. price	1.50

Blank Tapes

SCOTCH DYNARANGE CASSETTES		
C60	1.07	0.59
C90	1.50	0.79
C120	2.10	0.89
SCOTCH HIGH ENERGY		
C60	1.47	0.75
C90	1.78	0.99
C90 five pack with free Head Cleaner	Sp. price	4.95
SCOTCH Chrome Dioxide Cr02		
C60	1.72	0.95
C90	2.15	1.25
C120	2.81	1.60
SCOTCH CLASSIC CASSETTES		
C60	1.75	1.40
C90	2.33	1.80
SCOTCH Low Noise 8-Track Blank Cartridges		
90 mins	2.17	1.30
SCOTCH CLASSIC CARTRIDGES		
45 mins	2.05	1.85
90 mins	2.48	2.00
SOLAVOX		
7 in metal spool	Sp. price	1.50
SCOTCH HI-FI DYNARANGE SPOOLED TAPES		
5 1/2 in LP 1200	4.19	2.70
7 in LP 1800	5.51	3.50
SCOTCH HI-FI DYNARANGE DOUBLE PLAY		
5 1/2 in DP 1800	5.51	3.50
7 in DP 2400	6.94	4.40
SCOTCH CLASSIC REEL		
7 in 1200 ft	4.98	4.00
7 in 1800 ft	6.21	5.00
7 in 2400 ft	8.41	6.80
10 1/2 in 2400 ft	11.96	9.60
10 1/2 in 3600 ft	14.39	11.60
10 1/2 in 4800 ft	18.91	14.90
VIDEOCASSETTES		
VC 60	Sp. price	16.50
T.D.K. RECORDING TAPE		
TDK DYNAMIC CASSETTES		
D60	1.12	0.59
D90	1.62	0.90
D120	2.14	1.20
TDK SUPER DYNAMIC CASSETTES		
SD C60	1.32	0.69
SD C90	1.79	0.99
SD C120	2.55	1.49
TDK SUPER AVILYN CASSETTES		
SA C60	1.90	1.15
SA C90	2.70	1.70

Blank Tapes continued

TDK AUDUA CASSETTES		
C60	1.79	1.10
C90	2.55	1.55
TDK AUDUA SPOOL TAPE		
L1800	4.99	3.25
L3600 on metal NAB reel	13.69	8.90
MEMOREX RECORDING TAPE		
MRX02 Cassettes		
C60	1.34	0.79
C90	1.77	1.10
C120	2.44	1.39
C90 twin pack	Sp. price	2.00

Microphones

AKAI		
ADM20	9.99	7.90
AKG		
D4	6.19	4.25
D5	9.45	6.50
D190E/H	41.54	29.90
MARANTZ		
SUPERSCOPE EC1	9.50	4.50
SHURE		
515 SA High impedance	24.30	17.50
515 SB Low impedance	24.30	17.50

Hi-Fi Cassette Tape Recorders

AKAI		
CS34D Dolby stereo deck	138.75	99.50
GXC39D Dolby stereo deck	195.00	129.90
CS705D Dolby stereo deck front load	179.50	139.90
GXC310D Dolby stereo deck two capstans	241.50	149.90
CS707D Dolby stereo deck front load	216.49	169.90
GXC325D Dolby stereo deck two capstans, three heads	311.00	239.90
GXC710D Dolby stereo deck front load	259.50	199.90
GXC740D Dolby stereo front load, three heads, dual capstan	374.00	289.90
GXC760D Dolby stereo front load, three heads, dual capstan, three motors, servo control	459.00	359.90
AMSTRAD		
7050 Dolby stereo deck	105.18	79.90
7070 Dolby stereo front load	127.32	99.50
FERGUSON		
3279 stereo deck	64.95	54.90
3280 Dolby stereo deck	89.95	69.90
GOODMANS		
SCD100 Dolby stereo deck	192.85	139.90
H.L.		
CTR1 stereo deck	79.95	39.90
MARANTZ		
5220 Dolby stereo deck front load	266.91	221.90
5420 Dolby stereo deck	354.30	294.90
5120 Dolby stereo deck	260.62	217.90
PHILIPS		
N2511 Dolby, DNL stereo deck	149.00	117.50
N2412 Stereo recorder inc. two loudspeakers	113.50	78.90
N2408 Ski slope, stereo auto change deck inc. two 10 watt amps and DNL noise reduction	199.00	154.90
2520 Dolby & DNL stereo deck	199.00	129.90
PIONEER		
CT 4141A Dolby stereo deck	135.82	99.90
CT 5151 Dolby stereo deck	154.22	119.90
CTF 2121 Dolby stereo front load	181.59	139.90
CTF 6060 Dolby stereo front load	234.06	189.90
CTF 7070 Dolby stereo front load	263.52	209.90
CTF 8080 Dolby stereo deck front load	317.03	249.90
CTF 9191 Dolby stereo front load	374.13	259.90
ROTEL		
RD20 Dolby stereo deck	199.90	149.90

Hi-Fi Cassette Tape

Recorders continued

SANSUI		
SC2000/2002 Dolby stereo deck front load	222.99	166.90
SC3000/3003 Dolby stereo deck front load	250.09	186.90

Headphones

AKAI		
ASE 11	16.45	11.90
ASE 22	24.20	16.90
AKG		
K140	21.04	13.90
K240	33.98	23.50
KOSS		
Easy Listener	29.14	21.90
HV 2	15.69	14.90
Technician 2	—	34.90
PRO-4AA	38.98	27.90
PRO-5LC	—	33.90
K6	17.27	12.90
K6/LC (with volume con- trol)	19.74	16.50
K125	—	14.90
K135	—	18.90
K145	—	22.90
Phase 2	—	37.90
PIONEER		
SE 205	12.69	10.75
SE 305	19.82	16.50
ROTEL		
RH 930 Electret Condenser SANSUI	37.50	24.90
SH5	26.58	18.50
SOLAVOX		
300	5.67	4.50
WHARFEDALE		
Isodynamic	28.00	16.90

Pick-up Arms & Heads

LUSTRE		
pickup arm	41.46	22.90
AUDIO		
Technica AT 1005 Mk. II	20.13	16.50
Technica AT 1009	68.66	39.90
CONNOISSEUR		
SAU2	18.00	14.50
SME		
3009 Ser 1.1 Fixed Head Shell	56.70	39.90
S2 Head Shell	4.79	3.45

Hi-Fi Furniture

Schreiber self assembly Hi-Fi Housing units in wood finish and white.		
Wood finish		
14/222	62.95	46.90
14/217	52.45	41.90
14/219	31.45	24.90
14/220	34.10	25.90
White finish		
15/222	59.80	44.90
15/217	49.85	39.90
15/219	29.90	23.90
15/220	32.55	24.75
Send for illustrated leaflet		

Hi-Fi Stereo Systems Complete

ALBA		
632 Mono record player ...	35.96	29.95
DECCA		
5326 Compact 3 inc. stand with radio and decoder	158.85	89.90
FERGUSON		
3047	61.85	49.90
3457 with radio and de- coder	112.10	71.90
3475 with radio and de- coder	143.95	109.90
GEC		
4022H with radio and de- coder	100.80	67.50
HMV		
2046	87.95	69.90
ITT		
KP 821 Stereo record player	42.75	32.90
PYE		
5002 with radio and de- coder	116.55	69.90
MUSIC CENTRES		
BUSH		
Arena BS 3042 with stereo cassette	235.00	169.90
DECCA		
5339 with stereo cassette	242.10	189.90
FERGUSON		
3470 with stereo cassette	201.75	139.90
3471 with stereo cassette	159.95	125.90
GARRARD		
GA150 with stereo cass- ette	269.95	209.90
GRUNDIG		
Studio 3000 with stereo cassette	326.26	283.90
PIONEER		
M6500 with stereo cass- ette (speakers extra)	387.93	298.00
CS313A speakers (pair) (for above)	78.37	59.50

PLEASE NOTE:

There are no longer Recommended Retail Prices on some brands of Hi-Fi equipment. Consequently some Recommended Prices shown are prices recommended prior to the end of September 1976. These are left for your information to assist you in evaluating your purchase.

COMET ECLIPSE

SPECIAL ANNOUNCEMENT

Comet have acquired Eclipse Discount Stores, which will trade as part of the Comet Group. The Comet prices advertised here, together with all the benefits and guarantees associated with shopping at Comet, now apply at the Eclipse stores.

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Tel: 041-886 5731

COMET Budget Hi-Fi Systems

SYSTEMS COSTING UP TO £150

Rec. Retail Price Inc. VAT	Comet Price Inc. VAT
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AMSTRAD 8000 Mk 3 amplifier 10 watts RMS per channel plus McDonald MP60 turntable de luxe base and cover, fitted with ADC K8 magnetic cartridge plus two Alba UA300 loudspeakers.

119.27 83.70

SOLAVOX 20 amplifier 10 watts RMS per channel plus McDonald MP60 turntable de luxe base and cover, fitted with ADC K8 magnetic cartridge plus two Wharfedale Chevin loudspeakers.

130.01 88.30

ALBA UA700A amplifier 10 watts per channel with McDonald MP60 TPD1 turntable de luxe base and cover, ADC K8 magnetic cartridge plus two Alba UA300 loudspeakers.

150.31 103.30

SOLAVOX 30 amplifier 15 watts per channel plus McDonald MP60 turntable de luxe base and cover, fitted with ADC K8 magnetic cartridge plus two Solavox TK30 loudspeakers.

162.53 108.30

AMSTRAD IC2000 Mk 3 amplifier 2 x 25 watts RMS plus McDonald MP60 turntable TPD1 de luxe plinth cover and ADC K8 magnetic cartridge plus two Solavox TK30 loudspeakers.

165.32 119.70

ROTEL RX102 Mk. 2 AM/FM/MPX tuner amplifier 2 x 10 watts RMS plus McDonald MP60 turntable, TPD1 de luxe plinth and ADC K8 magnetic cartridge, with two Alba UA300 loudspeakers.

188.81 133.70

ALBA 1500 tuner amplifier 2 x 10 watts with MP60 TPD1 turntable de luxe base and cover fitted ADC K8 magnetic cartridge plus 2 Alba UA300 loudspeakers.

196.31 133.70

AMSTRAD IC2000 Mk 2 2 x 20 watts plus Amstrad TP12D belt drive turntable with a Shure M55E and two Amstrad 2500 loudspeakers.

178.20 135.95

SYSTEMS COSTING UP TO £200

PIONEER SA5300 amplifier 2 x 12 watts RMS plus Garrard 125SB belt drive, turntable, plinth, cover, fitted with Shure M75/6/SM magnetic cartridge plus two Wharfedale Denton 2 XP loudspeakers.

214.20 159.70

AMSTRAD 5050 tuner amplifier AM/FM/MPX 2 x 25 watts RMS with Garrard SP25 Mk 4 turntable with Garrard plinth, hinged lid and Shure M75/6/SM magnetic cartridge plus two Amstrad 2500 loudspeakers.

219.16 162.70

SANSUI 221 tuner amplifier AM/FM/MPX 2 x 10 watts RMS with a McDonald BDS 80 belt drive turntable, base and cover fitted with ADC K7E magnetic cartridge plus two Wharfedale Chevin loudspeakers.

235.43 167.70

ROTEL RA312 amplifier 2 x 18 watts RMS plus McDonald BDS90 belt drive turntable base, cover and ADC K5E cartridge plus two Wharfedale Linton 3XP loudspeakers.

237.68 174.70

AMSTRAD 5050 tuner amplifier 2 x 25 watts RMS with Amstrad TP12D belt drive turntable and Shure M55E magnetic cartridge plus two Amstrad 2500 loudspeakers.

235.89 177.95

SYSTEMS COSTING UP TO £250

Rec. Retail Price Inc. VAT	Comet Price Inc. VAT
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GOODMANS Model 40-40 amplifier 2 x 30 watts RMS plus the new Garrard 125SB turntable fitted plinth, cover and Shure M75/6/SM magnetic cartridge plus two Goodmans RB35 loudspeakers.

312.79 200.70

SANSUI AU2900 amplifier 2 x 17 watts plus McDonald BDS95 belt drive turntable with base, cover, fitted ADC K5E magnetic cartridge plus two Celestion Ditton 15 loudspeakers.

294.83 211.70

ALBA UA900 amplifier 2 x 33 watts RMS with McDonald BDS95 belt drive turntable fitted ADC K5E magnetic cartridge plus two Goodmans RB35 loudspeakers

305.74 211.70

PHILIPS RH851 AM/FM/MPX tuner amplifier 2 x 15 watts Integral stereo cassette deck with Philips D.N.L. circuit supplied complete with two Philips RH442 loudspeakers plus Garrard 125SB belt drive turntable with base, cover and Shure M75/6S cartridge.

318.19 214.90

SANSUI 331 tuner amplifier AM/FM/MPX 2 x 15 watts RMS with a McDonald BDS 95 TPD belt drive turntable, base and cover fitted with ADC K5E magnetic cartridge plus two Wharfedale Linton 3XP loudspeakers.

303.18 221.70

PIONEER SA6300 amplifier 2 x 22 watts RMS plus Pioneer PL112D turntable with base, cover and Shure M75ED magnetic cartridge plus two Wharfedale Linton 3XP loudspeakers.

294.38 226.68

ROTEL RX202 AM/FM/MPX tuner amplifier 2 x 20 watts plus Garrard 125SB belt drive turntable plinth, cover and Shure M75/6/SM cartridge with two Celestion Ditton 15 loudspeakers.

330.84 239.70

SYSTEMS COSTING OVER £250

ROTEL RA412 amplifier 2 x 25 watts RMS plus Rotel RP1500 with arm, belt drive turntable base, cover fitted with an ADC Q36 magnetic cartridge plus two Wharfedale Glendale 3XP loudspeakers.

335.01 261.20

PIONEER SX450 AM/FM/MPX tuner amplifier 2 x 15 watts with PL112D belt drive turntable inc. plinth hinged cover and Shure M75ED magnetic cartridge plus two Wharfedale Linton 3XP loudspeakers.

345.00 264.68

GOODMANS Module 90 AM/FM/MPX tuner amplifier 2 x 30 watts RMS plus the Garrard 125SB turntable, belt drive, 'S' type arm, fitted plinth cover, and Shure M75/6/SM magnetic cartridge with two Goodmans RB35 loudspeakers.

379.63 265.70

AKAI AA1020 AM/FM/MPX tuner amplifier 2 x 20 watts RMS plus Akai AP003 turntable with Audio Technica AT11 magnetic cartridge and two Wharfedale Linton 3XP loudspeakers.

445.62 306.70

SYSTEMS COSTING OVER £250 Cont.

Rec. Retail Price Inc. VAT	Comet Price Inc. VAT
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FERROGRAPH F208 Mk 2 amplifier 2 x 20 watts, plus the new Garrard GT55P turntable fitted base Cover and Shure M75ED magnetic cartridge with two Leak 3030 loudspeakers.

425.19 309.30

ROTEL RA612 amplifier 2 x 35 watts RMS plus Rotel RP1500 with arm, belt drive turntable base, cover and ADC Q36 magnetic cartridge plus two Goodmans Achromat 400 loudspeakers.

474.23 315.20

ROTEL RX402 AM/FM/MPX tuner amplifier 2 x 25 watts RMS plus Rotel RP1500 belt drive turntable, base, cover and ADC Q36 magnetic cartridge with two Wharfedale Glendale 3XP loudspeakers.

417.61 320.20

PIONEER SX550 tuner amplifier 2 x 20 watts plus Pioneer PL112D belt drive turntable and Shure M75ED magnetic cartridge with two Celestion Ditton 15 loudspeakers.

421.46 321.68

PHILIPS RH743 AM/FM/MPX tuner pre amplifier 4 wave band manual FM plus 5 pre set FM, with Philips GA212 belt drive turntable fitted with GP401 magnetic cartridge plus two 30 watts RMS motional feedback RH541 loudspeakers.

423.50 373.90

SANSUI 551 AM/FM/MPX tuner amplifier 2 x 20 watts with Garrard 86SB belt drive turntable, hinged lid, and fitted with Shure M75/6 magnetic cartridge plus two Sansui ES200 loudspeakers.

507.63 375.80

ROTEL RX 602 AM/FM/MPX tuner amplifier 2 x 35 watts RMS plus Rotel RP1500 turntable and ADC Q36 magnetic cartridge with two Goodmans Achromat 400 loudspeakers.

568.83 390.20

AKAI AA1030 AM/FM/MPX stereo tuner amplifier 2 x 30 watts RMS plus Akai AP003 belt drive turntable, base, cover and fitted Audio Technica AT11 cartridge plus two Celestion Ditton 33 loudspeakers.

577.07 400.70

PHILIPS RH752 AM/FM/MPX tuner amplifier with Electronic search tuning 2 x 30 watts output plus Philips GA212 belt drive turntable fitted with GP401 magnetic cartridge and two Celestion Ditton 33 loudspeakers.

550.07 413.70

GOODMANS Module 150 tuner amplifier MW/LW/FM/MPX with 8 pre set FM push button tuner Garrard DD75 direct drive turntable with base, cover and Shure M95ED cartridge plus two Goodmans Achromat 400 loudspeakers.

660.44 431.60

PIONEER SX650 tuner amplifier 2 x 35 watts RMS plus Pioneer PL112D belt drive auto return turntable and Shure M75ED magnetic cartridge with two Pioneer HPM40 loudspeakers.

561.43 447.68

SYSTEMS COSTING OVER £250 Cont.

Rec. Retail Price Inc. VAT	Comet Price Inc. VAT
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ROTEL RX802 AM/FM/MPX tuner amplifier 2 x 50 watts RMS plus Rotel RP1500 turntable and ADC Q36 magnetic cartridge with two Celestion Ditton 44 loudspeakers.

641.51 469.20

PHILIPS RH831 AM/FM/MPX tuner amplifier 2 x 25 watts with Integral stereo Dolby cassette deck, plus Garrard 86SB Mk II belt drive turntable, base, cover fitted with Shure M75/6S magnetic cartridge, and two Wharfedale Glendale loudspeakers.

659.49 551.70

FERROGRAPH F608 amplifier 2 x 60 watts RMS plus Ferrograph SFM 1 Mk 2 FM/MPX tuner with a Garrard GT55 turntable with fitted base, cover and Shure M75ED magnetic cartridge plus two Ferrograph S1 loudspeakers.

759.32 552.20

PIONEER SX850 tuner amplifier 2 x 65 watts RMS plus Pioneer PL510A direct drive turntable with the Goldring G900 Super E 'micromass' magnetic cartridge and two Pioneer HPM 60E loudspeakers.

883.52 694.60

ROTEL RA1412 amplifier 2 x 110 watts RMS plus Rotel RP3000 inc. arm direct drive turntable inc. base, cover and Goldring G900 Super E magnetic cartridge plus two Wharfedale Airedale monitor loudspeakers.

935.80 717.05

PHILIPS RH832 Quadraphonic system, LW/MW/SW/FM/MPX/AFC stereo tuner/amplifier with built in SQ decoder, integral electronic controlled turntable fitted with Philips GP422 Super M 4 channel cartridge, with 2 RH544 front channels and 2 RH532 rear channel monaural feedback speakers—giving a true 240 watts RMS power.

1,012.50 754.50

SANSUI 9090 tuner amplifier AM/FM/MPX with the Sansui SR525 direct drive turntable and the New G900 'micromass' magnetic cartridge plus two Wharfedale Airedale loudspeakers.

1,114.00 833.45

SANSUI QRX7001 Quadraphonic system, AM/FM/MPX four channel tuner amplifier featuring QS, and CD4 decoders plus Sansui SR222P belt drive turntable, plinth, cover and the ADC Super XLM CD4 magnetic cartridge with four Sansui ES 200 loudspeakers.

1,274.52 950.30

PIONEER SX1250 AM/FM/MPX stereo receiver featuring a massive 160 watts RMS output per channel. Both channels driven into 8 ohms, a state of the art unit with all the sophisticated useful facilities you would expect from a top of the line product, such as a multipath FM indication DB. Stepped volume control and probably the finest FM and Audio performance achievable, coupled with the Pioneer PL510A direct drive turntable including plinth, cover and a Goldring G900 Super E magnetic cartridge plus two Pioneer HPM100 four way loudspeakers incorporating 12 inch. Carbon fibre bass cones for strength, light weight and rigidity. This then is a system for the sophisticated Connoisseur of Hi-Fi who must have the best

1,345.55 1,043.55

PIONEER SA9900 amplifier 2 x 110 watts RMS, plus Pioneer TX9500 AM/FM/MPX 5 gang front end tuner, Pioneer PL510A direct drive turntable, plinth, cover and Goldring G900 Super E cartridge with two Wharfedale Airedale SP loudspeakers plus Pioneer CTF 9191 front loading cassette deck.

1,696.41 1,275.25

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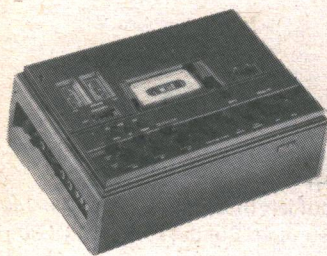
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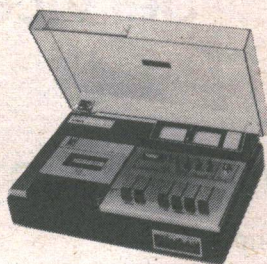
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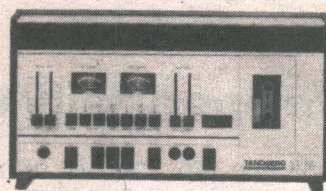
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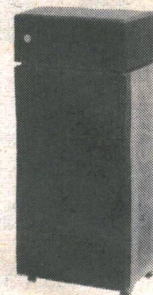
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Aiwa AX7500	P.O.A.
Harman Kardon 330B	£110.00
Harman Kardon 930	£205.50
Leak 3200	P.O.A.
Leak 3400	P.O.A.
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Sansui 331	£104.60
Sansui 9090	P.O.A.
Rotel HX152	P.O.A.
Rotel RX402	P.O.A.
Trio KR2600	P.O.A.
Trio KR3400 Sp. off.	£129.50
Teleton TA3000	£48.50

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Amcron	P.O.A.
Alba UA900	£79.50
BGW	P.O.A.
Cambridge P60	P.O.A.
Kenosonic Accuphase	P.O.A.
Lecson AC1/AP1/AP3	P.O.A.
Lux L80 & 80V	P.O.A.
Marantz 1200B	P.O.A.
Marantz 1070	P.O.A.
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Rogers A75	P.O.A.
Rotel RA1712	P.O.A.
Rotel RA1412	£299.50

Sansui AU4900	P.O.A.
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Sugden A21 & A48	P.O.A.
Trio KA1500	P.O.A.
Trio KA3500	P.O.A.

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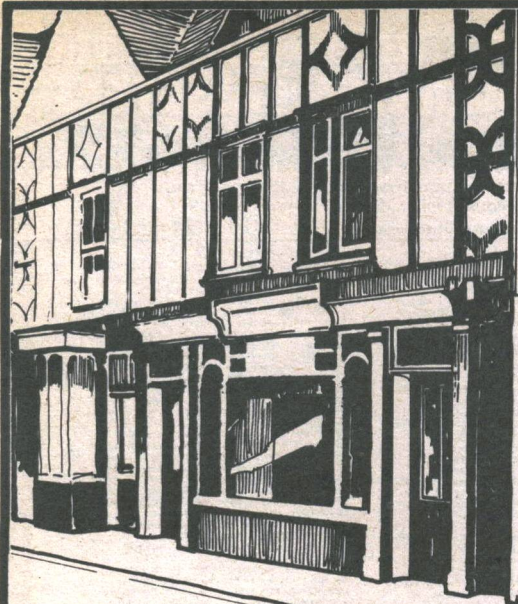
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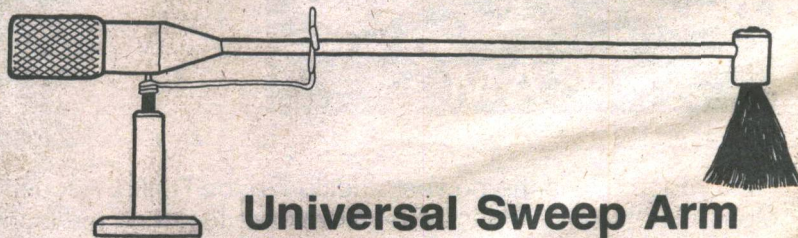
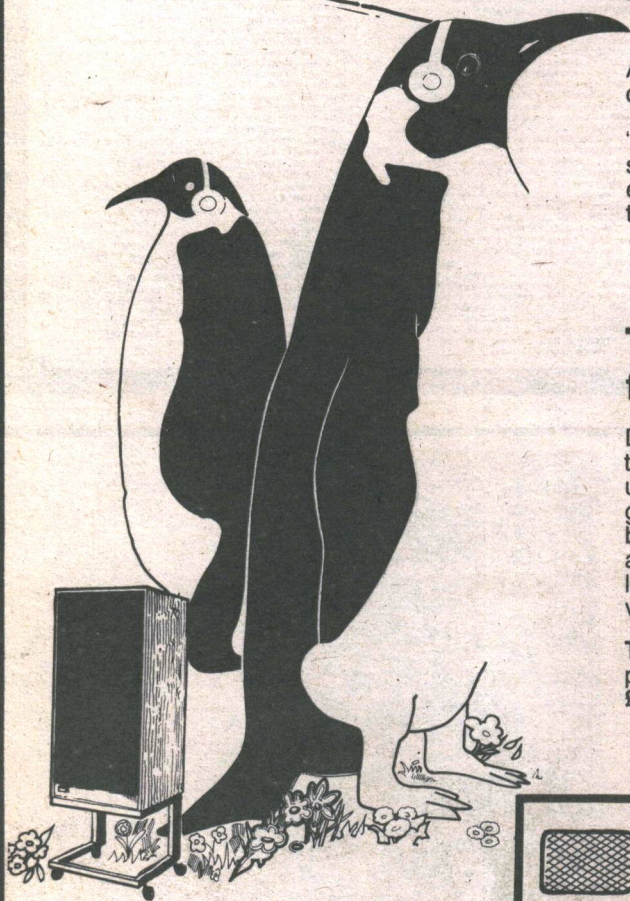
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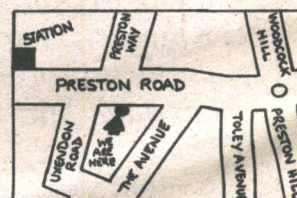
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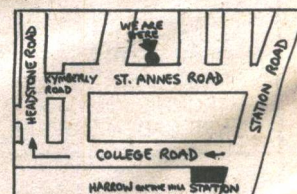
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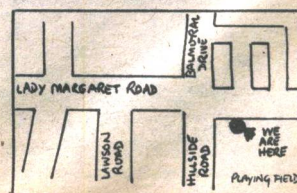
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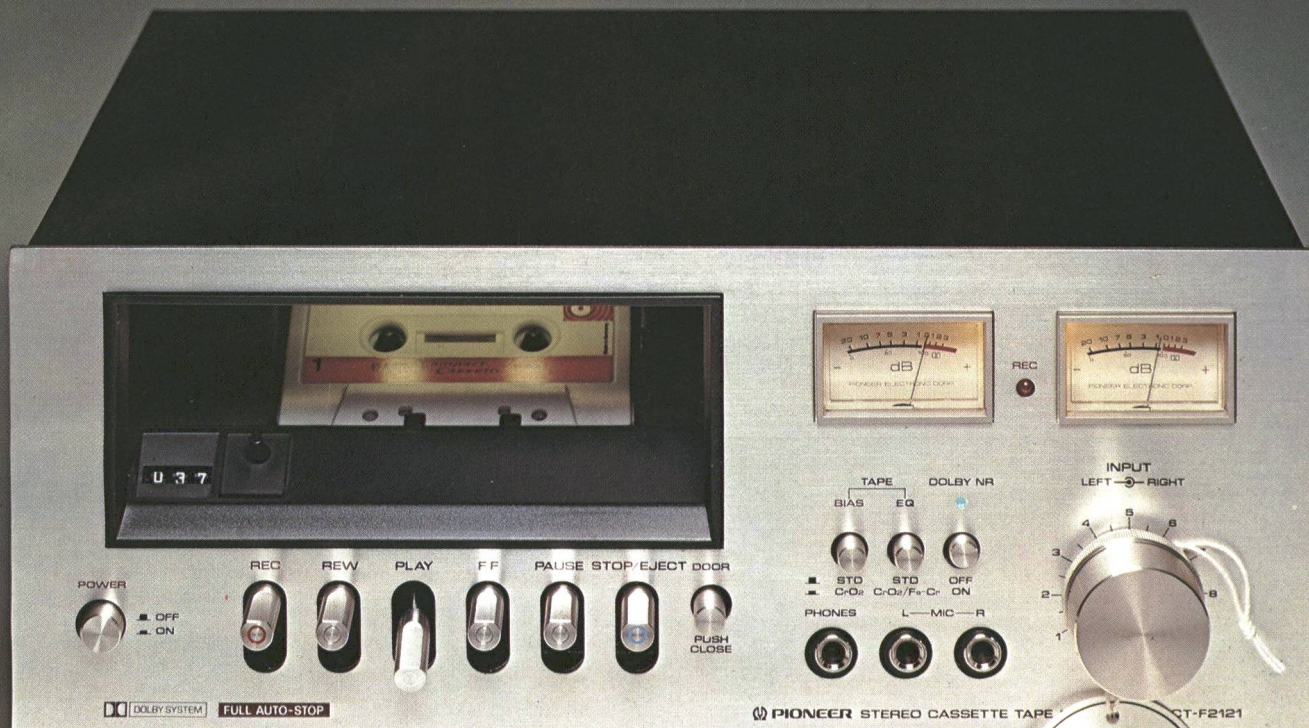
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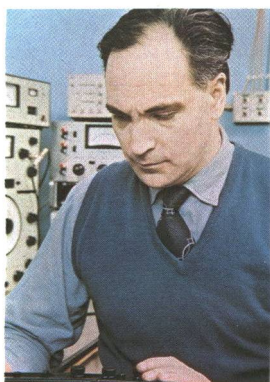
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Believe it or not, this is our

Until now, the most inexpensive Aiwa Dolby cassette deck was the highly rated 1300 (the one selected by Angus McKenzie in Hi Fi Choice as a Best Buy).

The new Aiwa 1250 that follows it, at £144.45, actually costs marginally less.

Yet it lacks nothing.

It has our oil damped elevation system that protects your cassettes against damage. (A feature hitherto reserved for our more expensive decks).

And a peak level indicator light at +5dB



cheap cassette deck.

to save you from over saturating your own recordings.

It also has Aiwa's interlinked Dolby/MPX filter switch, again normally reserved for our more expensive decks.

Plus and by no means least, a technical

specification that makes it the envy of lesser decks.

And, as you can see for yourself, its advanced ergonomic styling belongs to an altogether different price class of cassette decks.

AIWA®

SHUT YO TO EVERYTH



Chevin XP.



Denton 2XP.



Linton 3XP.



Glendale 3XP.

YOUR EYES ARE SAYING YOU SEE.



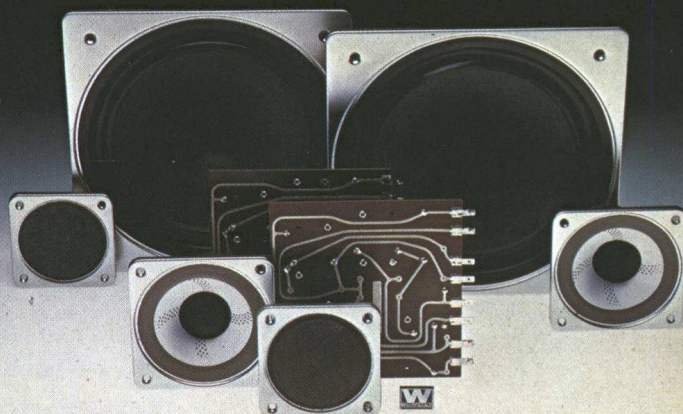
Dovedale SP.



Isodynamic Headphones



Airedale SP.



Glendale 3XP Kit.

You're looking at the entire Wharfedale range.
You're looking at equipment computers confirm is the ultimate.
You're looking at the results of pure research
by some of the world's leading acoustic engineers.
And you're looking at something that's best not looked at.
As the experts, please listen to us.



WHARFEDALE SOUNDS BETTER THAN THE COMMON HEARD.

 Rank Hi Fi, P.O. Box 70, Great West Road, Brentford, Middlesex, TW8 9HR.

Philips present the best thing that's happened to the cassette since we invented it.

Fourteen years ago, Philips invented the cassette. Since then, tape technology has developed into a competitive, modern industry.



Philips new N2511 cassette deck makes the most of today's, and tomorrow's, tape technology. It can handle both ferric and chrome tape by automatically adjusting to whichever is in use.

If your cassette deck doesn't have this refinement, perhaps you'd better read the rest of this advertisement.

The cassette deck that's as convenient as the cassette

When Philips developed the cassette for convenience, we never dreamed we'd develop a deck as convenient as this.

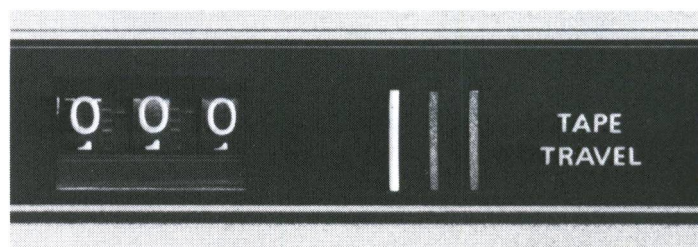
We've used all our electronic know-how to refine its design and operation. The result is a powerful, precision deck that integrates well with the most advanced hi-fi equipment.

Even though it's compact, we have fitted the N2511 with a host of special refinements.

It has a Dynamic Noise Limiter. A special system developed by Philips to reduce the background noise you get during quiet passages of music. It also has the Dolby* B system.

We've made the controls very simple and convenient to use. The N2511 has large, illuminated recording level meters and a three digit counter that can be reset at the push of a button.

We've designed a tape travel indicator to show you when the tape is moving. We've also fitted an automatic device that stops the tape and releases the buttons when it's finished playing.



You needn't worry about changing worn out heads. The long-life ferrite erase head and the 'FSX' record/playback head will last for years without wearing out.

So your new Philips N2511 cassette deck will sound much better, much longer.



Simply years ahead.

*Trademark of Dolby Laboratories Inc.

I like the sound of the new Philips N2511 cassette deck. Please tell me more.

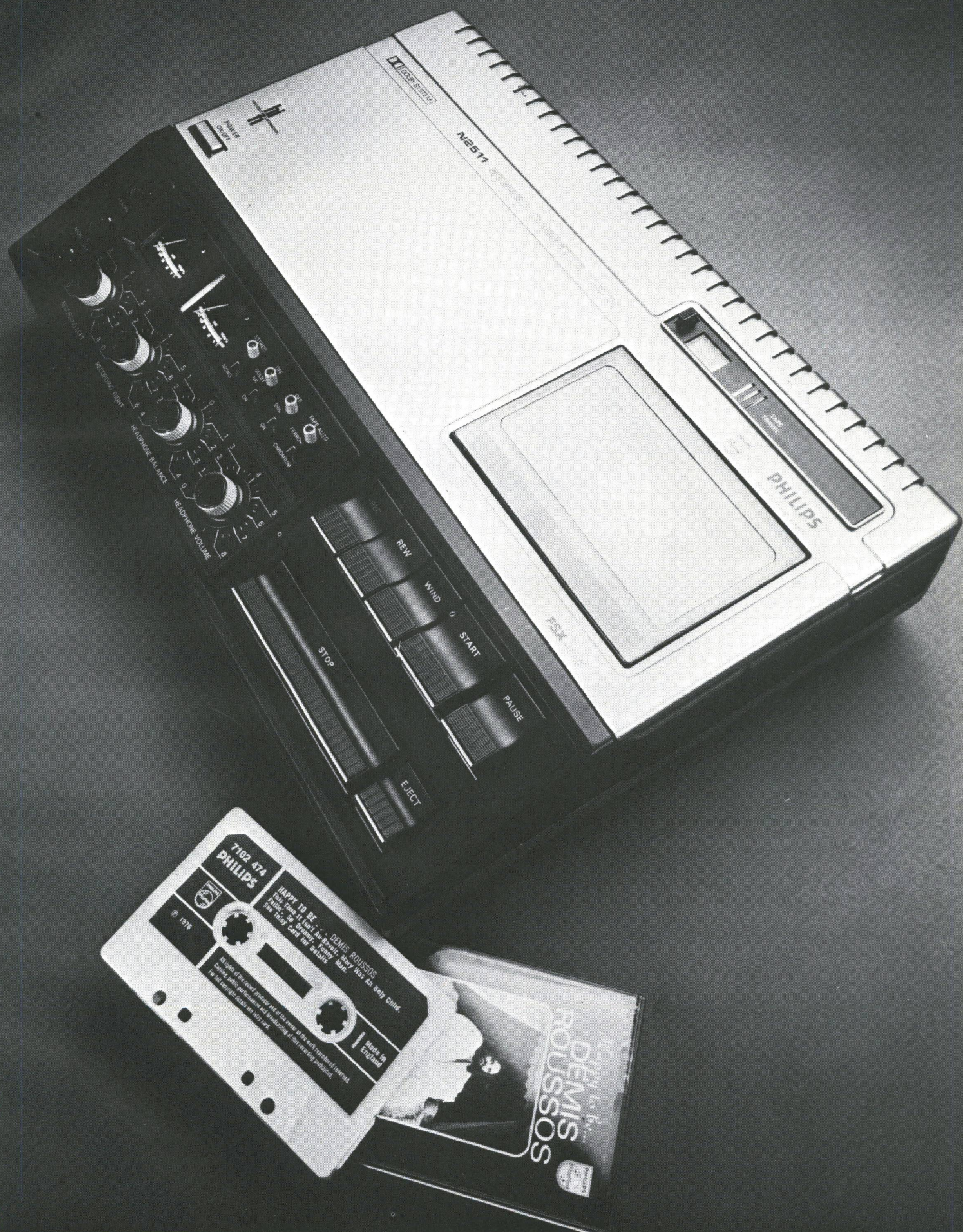
Name _____

Address _____

Philips Electrical Ltd., Room 555,
Audio Division, City House, London Rd.,
Croydon CR9 3QR.



PHILIPS



THE NEW ZERO TRACKING GARRARD GT55P IT PLAYS IT STRAIGHT.



HIGH FIDELITY greeted the introduction of the Garrard Zero Tracking Arm with: "Probably the best arm yet offered as an integral part of an automatic player."

Now we've made the best even better.

We've combined jewel and ball bearing to reduce friction in the pivots. We've halved the effective mass (reducing record wear) by die-casting the arm in magnesium alloy. For accuracy the stylus force is set with a calibrated and adjustable counter balance. Unwanted sideforces are neutralised by a magnetic bias compensator.

Tracking capability of 0.75 gm means it can use a very high

quality magnetic cartridge.

DC servo-controlled motor with flexible belt drive gives effective isolation from rumble.



The Garrard Zero Tracking Arm follows the original line along which records are cut—straight from record edge to spindle centre—eliminating tracking error and distortion.

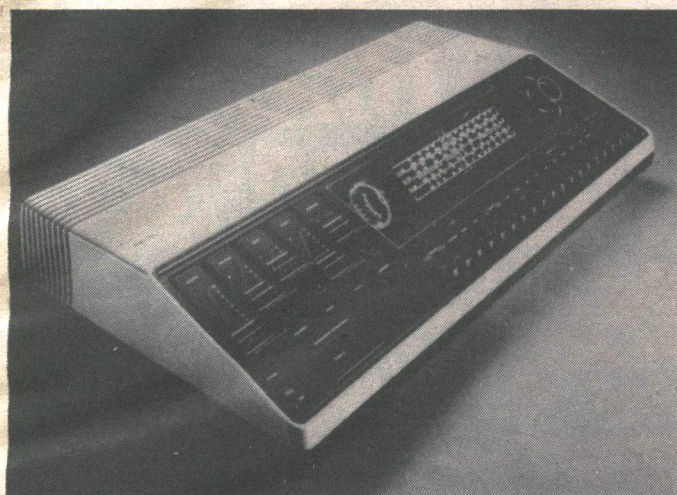
Other features include a $\pm 3\%$ fine speed adjustment, coupled with illuminated stroboscope, for accurate speed. Adjustable cue rate and cue control, viscous-damped. And the option of Shure M75 ED II cartridge.

All this Garrard precision comes in a beautifully styled wooden base with hinged perspex lid.

If you want to hear records how they were made to be played, you can't be without the GT55P. And at Garrard's price, you don't have to be.

Garrard
A PLESSEY COMPANY
precision at the heart of Hi-fi

NEWS NEWS NEWS NEWS



Fully automatic Philips receiver

Three products make up a new era in Philips hi-fi. One of the most fascinating introductions is a tape recorder with a neat but extremely intricate line-up of controls. Basically the recorder is a fully integrated 7in. spool machine with three heads, three speeds and electronic control of capstan motor. Full mixing facilities are built-in, and moreover there is a front-panel mounted set of preset level controls for each input channel.

Variable winding speed, solenoid operated transport, multiplay, LED overload indicators and full tone controls are all features, but topping them all is a 'post fading' control. This takes the form of a mechanically biased fader which when lifted gradually erases a recording already existing on the tape. This permits a gradual fade in or out of an earlier recording, and becomes a good fault-corrector which hitherto required a dub from one machine to another.

The next unit in mind is the AH762 tuner-preamplifier which builds in VHF, medium wave, long wave and a short waveband. All

normal functions in a tuner-(pre)amplifier are to be found, plus station preselection and auto-scanning. When the el-tuning button is pressed, followed by the speed and direction touch-control, the receiver will scan from one end to the other, pausing on suitably strong signals along the way. When the desired station is found you simply lift your finger away from the command control and the station remains tuned in with AFC applied.

The output is suitable for use with motional feedback loudspeakers containing their own amplifiers.

The third product is a new turntable, the GA222, which is totally restyled version of the GA212, plus a new pickup arm. It is also fully automatic, and possesses the Philips trademark of touch controls for triggering the various functions except on/off.

Closer to the GA212 is the GA312, which is a manual turntable with auto-lift-off, and it retains the old arm.

Signs of a definite line from the BBC on quadrasonic radio

The BBC have issued a statement, at last, defining their interest in quadrasonics. It seems that research and study will continue regarding a system suitable for use on the FM radio network, mainly because matrix systems available to the public at present are regarded as inadequate in terms of performance.

Development so far has resulted in the conception of 'Matrix H' which the BBC believes has quality potential for broadcast purposes, and retains excellent compatibility with stereo and mono decoding. It also possesses very good quadrasonic definition. Further inves-

tigations on Matrix H will continue although it is developed to a degree sufficient for live experiment. In fact, the BBC have disclosed that one Promenade Concert programme was transmitted in this way, with experts confirming its compatibility.

The BBC wisely, however, spell out that although experiments may continue, the first priority is to ensure high quality stereo coverage throughout the country. The other point emphasised is that no quadrasonic decoders at present on sale to the public are suitable for use with Matrix H.

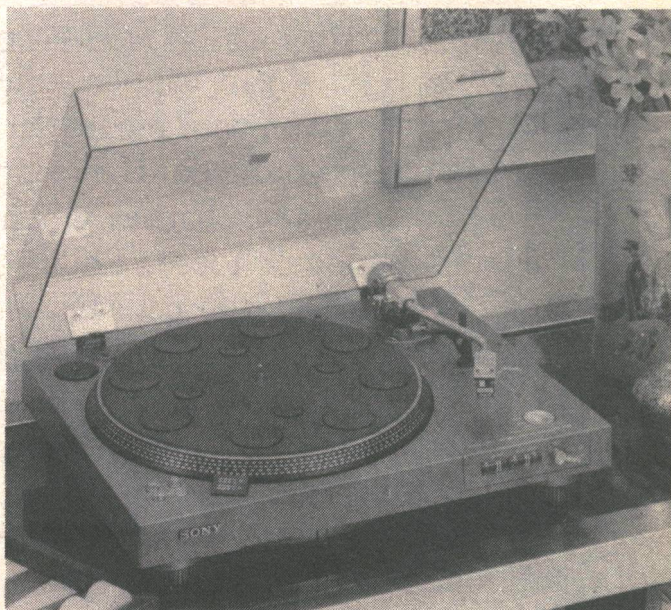
Three record decks from Sony

A few weeks back Sony revised their range of products, leaving their line-up of turntables with three models. The simplest is the PS-1700 — with belt drive and auto-return the main features. A 4-pole synchronous motor operates the platter at either 33 $\frac{1}{3}$ or 45rpm, with a wow and flutter rating of better than 0.08%, or 0.06% WRMS DIN. Signal-to-noise ratio is better than 63dB. A cartridge is supplied, of type MD-134G having a 0.5mil spherical tip.

Above this we move into direct drive systems, with the PS-3300. This employs a brushless DC

servo-motor, and we are told that special attention has been paid to ensuring good mechanical isolation to reduce feedback, and that wow and flutter is especially low at 0.04%W RMS. The arm is auto-return.

Top unit is the PS-4300, which uses the same motor as the 3300, but has other facilities built around it. For starters, it is fully automatic, although manual operation is possible. Tripping of the mechanism is by a light-operated sensor, enabling low tracking weights to be used with no adverse effect. Signal-to-noise ratio is said to be better than 70dB — 5dB better than the 3300.



New specification for Amsa tape

A strong push is about to be afforded to Amsa Magnetics cassette tapes in this country. Amsa Magnetics are the UK subsidiary of Audio Magnetics, who have become quite well known anyway for blank and pre-recorded tapes. The range to be offered is the Standard, Extra, Super and XHE. The Standard is a basic low-noise

ferric tape, available in C-60, C-90, and C-120 lengths. The extra simply refers to tape length, sizes being C-66 and C-99. Both of these types includes a head-cleaning leader tape, plus the special 'Paraflo' low friction guide system. Super cassettes are high density gamma ferric oxide tapes, while XHE contain Magnalinc ferric.





PHILIPS

"EVERY EVENING, THAT GREAT, HEAVY HEAD BORE DOWN ON ME"

"That big head made my life a misery. I've never been treated so badly. Finally, I just cracked up."

This is what can happen when you use a crude pickup head on your record deck.

It destroys your record collection.

Don't take any chances when you replace your cartridge, choose a Philips Super M.

The 7mg Magnet. Super M is material that generates an immensely powerful magnetic field for its weight.

The magnet we attach to the stylus weighs less than one tenth of a postage stamp. Because it's so light, the stylus can follow every variation in the record groove.

It picks up nuances that less sensitive cartridges miss. The wear on your records is very low indeed.

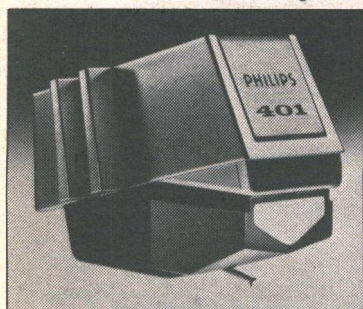
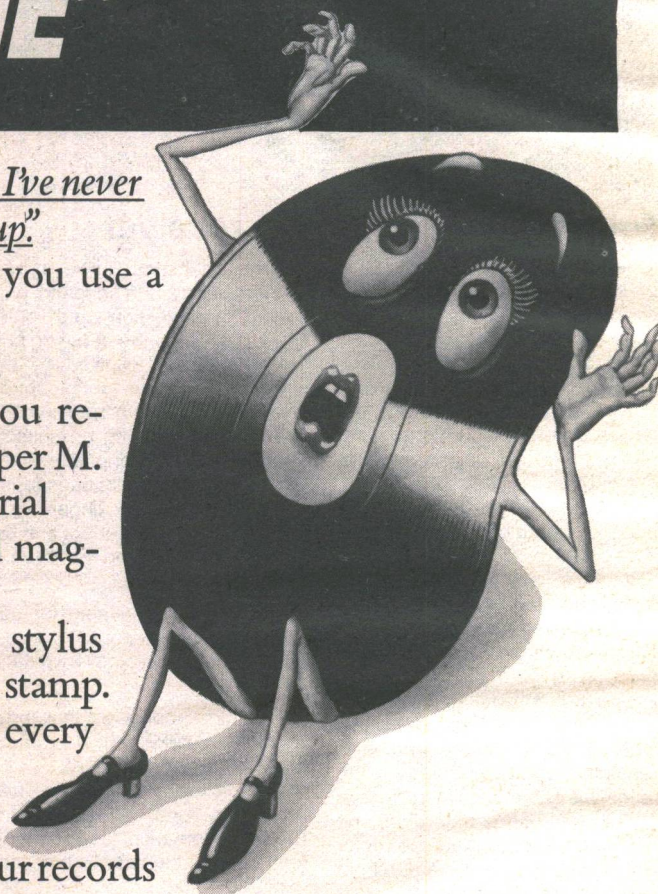
The Perfect Pickup. A good hi-fi system can cost hundreds of pounds. Naturally, you want the best performance it can give.

The quality of the sound reproduction depends very much on the quality of your cartridge. And whether it is the right type for your record deck.

There are four Super M cartridges in our range. Each one is suitable for most quality hi-fi systems.

Each one gives fine quality sound reproduction.

And they're all very kind to records.



Super M-'Kind to records'



Simply years ahead.

NEWS NEWS NEWS NEWS

Goodmans tidy up their range of cheaper loudspeakers

Goodmans, having sorted out the classy end of the loudspeaker market with the Achromat series, have now applied intelligence to the cheaper bracket. The result is a range of three enclosures ranging in price between £36 and £66 each.

The RB18 is the smallest of the three, possessing an enclosure of 18 litres internal volume and two drive units — a dome tweeter and 200mm bass. Recommended amplifier powers are 10 to 40 watts. The RB20 adds a midrange cone radiator, with its own sealed

rear 'termination', plus a couple of litres in volume. The RB35 is considerably larger at 35 litres, but uses the same tweeter and mid-range plus a 260mm bass unit.

Finishes available are standard teak and walnut.



Motional feedback enters professional studio realms now

A month or two back we published a short piece reminding you all of the existence of Philips Motional Feedback loudspeakers. We even suggested that Philips had lain dormant on the subject. Almost it seems out of revenge we are now treated to a new Motional Feedback product — this time a studio model speaker weighing some 68lb!

It is quite a magnificent product containing three drive units and three amplifiers, with plenty of range of control. First thoughts with such a large speaker are, 'will it lift off the floor onto a stand, and if not what happens to the bass response?' This, it seems, is all taken care of. Three switches are provided on each speaker, labelled 'side to wall', 'rear to wall' and 'standing on floor'. It seems you place the speaker in your preferred situation, analyse the conditions and set the switches appropriately. The effect of each switch is printed on a response curve mounted on the inside of the control unit flap cover. There is even a bass control, treble roll-off and roll-off frequency.

A 50-watt amplifier with motional feedback supplies the specially equipped 12in. bass unit, a 35-watt amplifier drives a 2in. midrange dome and a 15-watt amplifier powers the 1in. dome tweeter. Each amplifier has full overload protection. Inputs are quite versatile, with a continuously variable 1 — 23V socket (for running from a power amplifier) and the more normal preamplifier inputs of 10kohms at 1V symmetrical and 100kohms at 1V asymmetrical. Switching on and off the power amplifiers can either be accomplished manually or automatically by application of an audio signal.

BRIEF NEWS

Pioneer have opened a factory in Erpe, Belgium. This appears to be the first occasion that a Japanese hi-fi manufacturer has established a large plant within Europe. Amplification equipment and loudspeakers will be produced there.

A range of tasty tubular chromed steel stands is manufactured by Mundy Mills Engineers Ltd, Park Works, Cotmanhay Road, Ilkerton, Derbyshire.

EMI records and tapes have released a special cassette tape to help cure insomnia. Music and sounds have been recorded by Dr Robert Sharpe, to correspond with those waveforms which are most conducive to sleep.

BRIEF NEWS

Peter Eardley, Managing Director of AKG Equipment Ltd, is moving on from that role to start up a photographic studio business. AKG manufacture top-flight microphones for all purposes.

Amstrad are bringing out a front-loading cassette deck called the 7070. It has Dolby plus all other normal features. Price is to be £113.00.

Laskys have introduced a Hi-Fi Charter, which is a special extension to guarantees under the Sale of Goods Act covering a 14-day money-back offer in cases of dissatisfaction, plus special trade-in pricing deals.

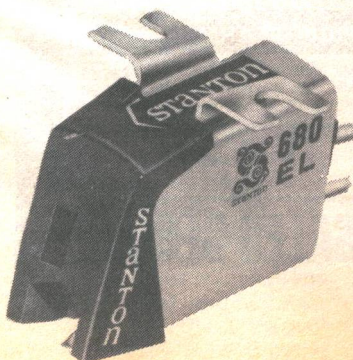
BRIEF NEWS

Tannoy, themselves a subsidiary of the Harman organisation, are now distributors for Ortofon products. All pickup cartridges and styli in the range will be imported.

Leader are manufacturing a wow and flutter meter with a most sensitive range of 0.03%. Flat and CCIR weighting can be applied. No price is quoted, but details can be obtained from C. E. Hammond & Co. Ltd, 111 Chertsey Road, Byfleet, Surrey.

Laskys are now stocking Harman-Kardon. Initially three receivers, an amplifier, a turntable and a cassette deck will be in the catalogue.

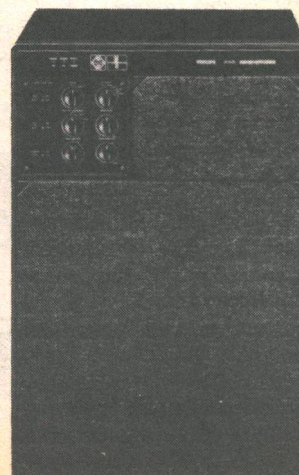
Disco sound is on the up-and-up-courtesy Stanton



We're all sick of walking into a disco and having our ears assaulted by atrocious, distorted rubbish coming out of loudspeakers. Often it is the fault of the speakers, often the amplifier is clipping, but behind it all there is the problem of the cartridge. All disc-jockeys demand a rugged assembly, and will therefore choose a pretty basic type on the basis that distorted sound is better than no sound at all — should an expensive one expire.

Stanton have recognised the

need by producing a cartridge exclusively for disco applications — the Stanton 680EL. Good tracing is permitted by use of an elliptical tip, but to keep the tracking pressure up to reasonable levels 0.4 x 0.7 dimensions are used. Rated tracking force is 2 to 5gm. Design of the cantilever is sufficiently rugged to permit hand cueing and back tracking. The cartridge is supplied in the usual Stanton metal box, with a spare stylus. Replacement styli can be purchased in packs of one or three.



PLANET

HI-FI CENTRE

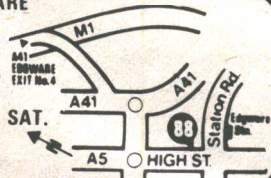
SERVICE Service is our keynote and has been since we were founded in the 1950's. We guarantee to provide parts and labour absolutely free of charge for 12 months on any item purchased from Planet and returned to us as faulty. We only sell goods that we consider to be reliable and backed by reputable manufacturers. All prices quoted are for cash or cheques backed by cheque card. We will be pleased to accept ACCESS or BARCLAYCARD. **SATISFACTION GUARANTEED**

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AMPLIFIERS

Armstrong 621	Prices on application	Cambridge T55 VHF	Price on application
Cambridge P60		Harman Kardon	P.O.A.
Harman Kardon	P.O.A.	Pioneer TX5300	£73.25
Pioneer SA5300	£64.50	Pioneer TX7500	£143.00
Pioneer SA6300	£79.50	Pioneer TX9500	£179.75
Pioneer SA7300	£123.75	Quad FM3	Price on application
Pioneer SA7500	£183.00	Rotel RT324	£70.00
Pioneer SA8500	£208.00	Rotel RT724	£82.00
Pioneer SA9500	£279.00	Sansui TU3900 TU5900 TU7900	P.O.A.
Pioneer SA9900	£414.50	Yamaha CT400	
Quad 33 303 405	Prices on application	Yamaha CT600	Prices on application
Rotel RA312	£61.25	Yamaha CT800	
Rotel RA412	£75.25	Yamaha CT7000	
Rotel RA712	£92.00		
Rotel RA812	£131.75		
Rotel RA1312	£222.00		
Rotel RA1412	£290.50		
Sansui AU2900			
AU3900 AU4900			
AU5900 AU7900			
Tandberg TA300M	Prices on application		
Yamaha CA400			
Yamaha CA600			
Yamaha CA800 Mk II			
Yamaha CA1000 Mk II			

TUNER/AMPLIFIERS

Aiwa 3060 Cass Receiver	P.O.A.
Aiwa 5080 Music Centre	P.O.A.
Armstrong 625	Prices on application
Armstrong 626	
Goodmans Module 90	£126.00
Goodmans Mod. 90 Compact	£223.00
Goodmans One Twenty	£143.50
Goodmans One-Fifty	£209.00
Harman Kardon	P.O.A.
Pioneer SX1010	£268.00
Pioneer SX450	£120.50
Pioneer SX550	£148.75
Pioneer SX650	£209.00
Pioneer SX750	£249.00
Pioneer SX850	£333.25
Pioneer SX950	£376.25
Pioneer SX1250	£575.00
Rotel RX202 Mk 2	£94.00
Rotel RX402	£130.00
Rotel RX602	£166.00
Rotel RX802	£210.25
Rotel RM5010 (Music Centre)	£290.75
Sansui 221 331 551 661 771	
881 8080 9090	Prices on application
Tandberg TR220	
Tandberg TR1040P	
Tandberg TR2055	
Tandberg TR2075	
Yamaha CR200	Prices on application
Yamaha CR400	
Yamaha CR450	
Yamaha CR600	Prices on application
Yamaha CR800	
Yamaha CR1000	

Armstrong 623	Prices on application
Armstrong 624	

TUNERS

Armstrong 623	Prices on application
Armstrong 624	

TURNTABLES

ADC Accutrac 4000	£232.00
Garrard SP25 Mk 4 Module with Shure M75-6 wired	£33.50
Garrard 125SB Module with Shure M75-6 wired	£44.00
Garrard 86SB MkII Module with Shure M75-6 wired	£59.00
Harman Kardon	P.O.A.
Pioneer PL112D	£62.25
Pioneer PL115D	£69.50
Pioneer PL117D	£103.25
Pioneer PL510A	£123.25
Pioneer PL530	£181.75
Pioneer PL550	£193.00
Rotel RP1500	£62.50
Thorens TD160BC (less arm)	£61.00
Thorens TD160C	£74.50
Thorens TD145 (Autolift)	£97.00
Thorens TD125 Mk II	£88.00

CARTRIDGES

ADC Q30	£7.00
ADC Q32	£9.25
ADC Q36	£12.00
ADC VLM II	£20.00
ADC XLM II	£25.00
ADC SUPER XLM	£35.00
Shure M44-7	£8.00
Shure M55E	£9.75
Shure M75 B	£12.00
Shure M74 EJ2	£15.00
Shure M75 ED2	£16.00
Shure M95 ED	£20.00
Shure V15 3	£39.50

STYLI

ADC RQ30	£5.85
ADC RQ32	£8.50
ADC RQ36	£9.75
ADC RVL	£12.00
ADC RXL	£14.00
ADC R/L	£17.95
Goldring D120 (G850)	£3.00
Goldring D110 (G800)	£3.50
Shure N44 7	£5.75
Shure N55 E	£7.95
Shure N75 B	£6.75
Shure N75 B	£8.00
Shure N75EJ2	£9.75
Shure N75ED2	£12.50
Shure N93 E	£9.00
Shure N95ED	£16.50
Shure VN35E	£18.25

SPEAKERS Complete

Acoustic Research	P.O.A.
Celestion UL6	Prices on application
Celestion UL8	
Celestion UL10	
Celestion D111 (pair)	£53.00
Celestion D115 (pair)	£85.00
Celestion D125 (pair)	£179.00
Celestion D133 (pair)	£130.00
Celestion D144 (pair)	£155.00
Celestion D166 (pair)	£255.00
Goodmans RB18 (pair)	£47.75
Goodmans RB20 (pair)	£60.75
Goodmans RB35 (pair)	£87.25
Goodmans Magnum SL (pair)	£102.75
Goodmans Achromat 100 (pair)	£73.00
Goodmans Achromat 250 (pair)	£107.50
Goodmans Achromat 400 (pair)	£143.00
IMF, all models	Prices on application
Jordan-Watts Janet (pair)	£48.50
Jordan-Watts Juno (pair)	£66.50
Jordan-Watts GT (pair)	£83.50
Jordan-Watts TLS (pair)	£165.60
KEF Coda	
KEF Cantor	
KEF Chorale	
KEF Cadenza	
KEF Corelli	
KEF Calinda	
KEF Cantata	
KEF model 103	
KEF model 104AB	
KEF 104F stands	
Jim Rogers JR149	
Rogers LS3 5A	P.O.A.
Rogers Export Monitor	P.O.A.
Tannoy Eaton (pair)	Prices on application
Tannoy Devon (pair)	
Tannoy Cheviot (pair)	
Tannoy Berkeley (pair)	
Tannoy Arden (pair)	
Wharfedale Chevin XP (pair)	£28.00
Wharfedale Denton 2XP (pair)	£42.00
Wharfedale Linton 3XP (pair)	£59.50
Wharfedale Glendale 3XP (pr.)	£82.50
Wharfedale Dovedale 3 SP (pr.)	P.O.A.

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Jordan-Watts Module	£15.50
Jordan-Watts HF Unit	£7.00
KEF KK1 Kit (pair)	£50.00
KEF KK3 Kit (pair)	£90.00
KEF T27	£7.00
KEF B110	£8.25
KEF B200	£9.60
KEF B139	£19.25
KEF DN12 T27 B110 B139	£6.95
KEF DN13 5 (T27 B200)	£4.95
KEF DN13 7 (T27 B110)	£4.45
Tannoy 10" HPD (pair)	Prices on application
Tannoy 12" HPD (pair)	
Tannoy 15" HPD (pair)	

TAPE DECKS & RECORDERS

Aiwa AD1200 (Cass. Dolby)	Prices on application
Aiwa AD1600 (Cass. Dolby)	

Aiwa AD1800 (Cass. Dolby)	P.O.A.
Aiwa AD6300 (Cass. Dolby)	
Aiwa AD6500 (Cass. Dolby)	
Akai 4000DS MkII (Reel)	£119.00
Akai 4000DB (Reel Dolby)	£170.00
Akai CS 34D Cass. Dolby	£94.75
Akai CS705D Cass. Dolby	£122.75
Akai CS707D Cass. Dolby	£148.00
Akai GXC 39D Cass. Dolby	£136.50
Akai GXC 310D Cass. Dolby	£139.75
Akai GXC 710D Cass. Dolby	£177.50
Akai GXC 75D Cass. Rev. Dolby	£157.50
Akai GXC 325D Cass. Dolby	£212.75
Akai GXC 740D Cass. Dolby	£256.00
Akai GXC 760D Cass. Dolby	£314.00
Goodmans SCD100 (Cass. Dolby)	£137.00
Harman Kardon	P.O.A.
Nakamichi 2i-0	P.O.A.
Nakamichi 3i-0	P.O.A.
Nakamichi 550	Prices on application
Nakamichi 600	
Nakamichi 700	
Nakamichi 1000	
Pioneer 12121 (Cass. Dolby)	£140.25
Pioneer 6060 Cass. Dolby	£181.25
Pioneer 7070 Cass. Dolby	£203.75
Pioneer 8080 Cass. Dolby	£245.00
Pioneer 9191 (Cass. Dolby)	£283.50
Revox 1102 Mk 4	Prices on application
Revox 1104 Mk 4	
Rotel RD12F Cass. Dolby	£136.75
Rotel RD20 (Cass. Dolby)	£136.75
Sansui SC3000 3	
Tandberg 3441X Recorder	
Tandberg 3541X Reel	
Tandberg 3641X Reel Dolby	P.O.A.
Tandberg 9141X Reel	
Tandberg 10XD Reel Dolby	
Tandberg TCD 310 (Cass. Dolby)	
Tandberg TCD 330 (Cass. Dolby)	
Yamaha TC511 Cass. Dolby	
Yamaha TC800 GL (Cass. Dolby)	

HEADPHONES

Koss PR05LC	£33.75
Koss PR04AA	£30.50
Koss HV1A	£24.00
Koss HV1LC	£26.60
Koss K0747	£21.50
Koss K6	£13.75
Koss K6LC	£17.50
Koss K0727	£15.90
Pioneer SE205	£10.30
Pioneer SE305	£16.25
Pioneer SE300	£17.30
Pioneer SE500	£24.20
Pioneer SE700	£40.50
Sennheiser HD414	£14.50
Sennheiser HD424	£20.75
Yamaha HP3	P.O.A.

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SME 3009 Improved	£35.50
SME 3009 S2 Improved	£41.00
Formula 4	Prices on application

ALL PRICES INCLUDE VAT @ 12 1/2%

Please add £2.50 per item towards carriage and insurance. (Cartridge and styli post 75p)

E. & O. E.

DEMONSTRATIONS, EXPERT GUIDANCE AND AFTER-SALES SERVICE

NEWS NEWS NEWS NEWS

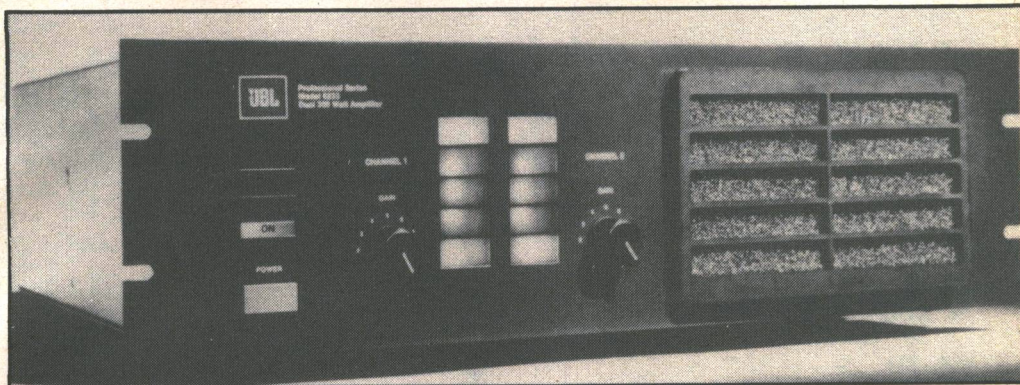
New business for Hammonds

Life is a-changing for Colin Hammond and his company. The famous Swiss brand of tape mechanism — Revox — is no longer under his wing but has moved on to F.W.O. Bauch who have for some time imported Studer — the professional side of the Revox business.

The gap, we gather, is to be filled by an agency for Japanese Otari equipment, more details of which will doubtless follow shortly.

Hammonds have simultaneously offered us information on their range of Sonus cartridges, which are classified quite simply as Blue Label, Red Label and Green Label. The first of these is the top-flight model, costing some £59 plus VAT, and comes equipped with a multi-radial tip. The Red Label costs £46, plus VAT, and is an elliptical version. The cheapest at £39 plus VAT has a conical tip.

The JBL side of the business has news too, with two loudspeakers and a power amplifier in line for discussion. The JBL L200 has been recognised as a studio mastering loudspeaker for some years, and now is updated as the L200B. Among the revisions is a new 15in. bass unit which takes the useful response an octave lower than its



predecessor and possesses a free air resonance of 16Hz. The high frequency driver remains the same, but a compensating network in the crossover extends the HF response 3kHz higher. The HF driver now runs lower in the mid-band as well, the crossover having been taken down to 800Hz instead of 1200Hz.

A step above the L200B is a totally new speaker, the L300, which is identical to the brand new studio version 4333. The bass driver is obviously similar or the same as in the L200B, but above this is a midrange unit running between 800Hz and 8.5kHz, in construction being an 11-lb compression horn loaded driver. Above 8.5kHz is a horn-loaded slot radiator. We haven't been offered dimensions, but there is little doubt

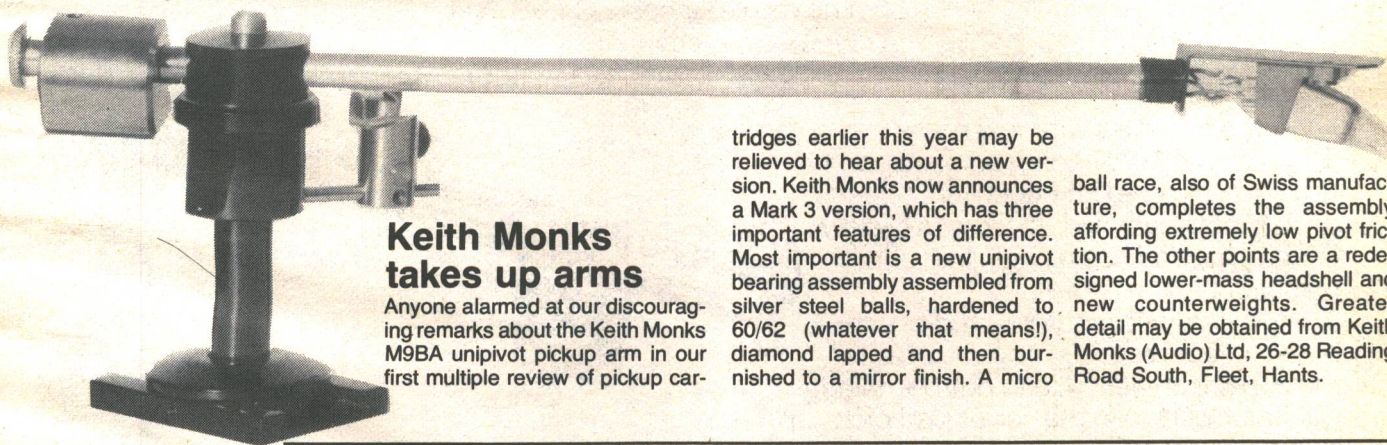
about its construction because the weight of the enclosure, without drive units and crossover, is 80lb!

The final beastie on the JBL list is a 600-watt per channel amplifier. It is clear from the information received that it is designed with reliability in mind — obviously for studio applications, for the power delivery is maintained right up to ambient temperatures of 120°F and under continuous operation in such conditions. At no time is the distortion permitted to rise above 0.1% — both THD and IM. Output stages are fully complementary, bearing 12 150-watt devices in each channel. Stability is quoted as perfect into all loads from reactive, mismatched, short circuit and open circuit. For this be prepared to pay £1100, plus VAT, provisionally.

Sound of Celestion

Judging by numerous telephone calls, anything up to 997 readers are awaiting with baited breath the results of the competition which appeared in our July 1976 issue. The winners are, in order of 1st through to third prize, J. Allan, Glasgow; A. W. Busby, Redruth, Cornwall, and R. Tipping, Blunham, Bedford

For those who suffered in wondering how many words were claimed by the winner, it was the massive total of 2,253.



Keith Monks takes up arms

Anyone alarmed at our discouraging remarks about the Keith Monks M9BA unipivot pickup arm in our first multiple review of pickup car-

tridges earlier this year may be relieved to hear about a new version. Keith Monks now announces a Mark 3 version, which has three important features of difference. Most important is a new unipivot bearing assembly assembled from silver steel balls, hardened to 60/62 (whatever that means!), diamond lapped and then burnished to a mirror finish. A micro

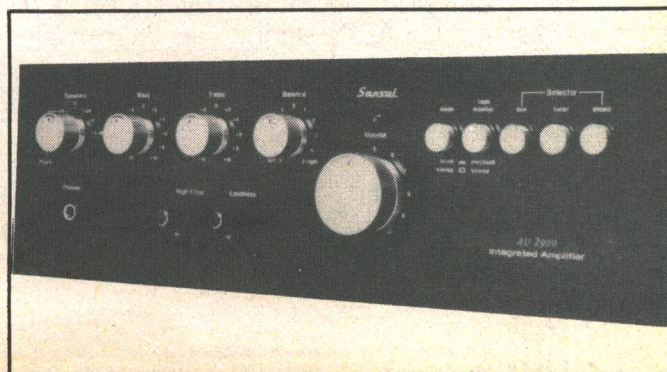
ball race, also of Swiss manufacture, completes the assembly affording extremely low pivot friction. The other points are a redesigned lower-mass headshell and new counterweights. Greater detail may be obtained from Keith Monks (Audio) Ltd, 26-28 Reading Road South, Fleet, Hants.

New amps and tuners for Sansui

Sansui have expanded their AU/TU ranges by adding three more amplifiers and two more tuners. The amplifiers, AU2900, AU5900, and AU7900 have increased power output, with little variation in price from the previous comparable models. They produce 15, 45 and 75watts respectively into 8ohms, with frequency ranges of 40-20kHz (AU2900) and 20-20kHz (AU5900 and AU7900). THD is low at 0.3%, 0.1% and 0.1% respectively at rated power output. RRP's are £85.23, £190.75

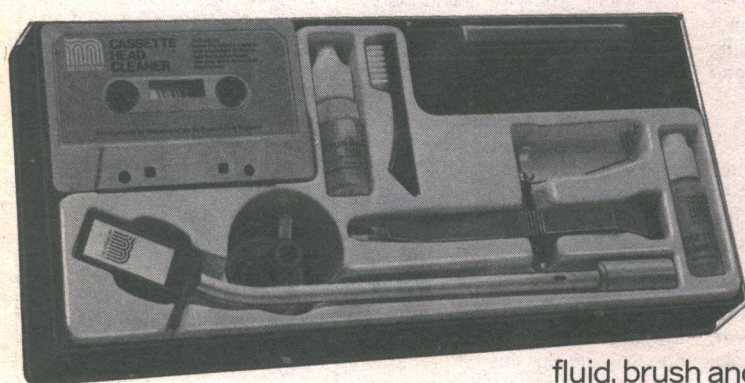
and £261.35 + VAT.

The new tuners are the TU5900 and TU7900 and match their respective amplifiers. Both are AM/FM and have the highest claimed sensitivities of the range, 1.8μV (TU5900) and 1.7μV (TU7900). Other specifications are equally impressive, and RRP's are £173.23 + VAT for the TU5900 and £203.26 + VAT for the TU7900. All the new models can be seen at Sansui's showroom at 39/41 Maple Street, London, W1.



AU-2900 — one of the Sansui amplifiers

Think of the best in hi-fi. We can improve it.



The expensive equipment in which you have invested so much, will carefully reproduce every crackle, pop and hiss that dust, dirt and static can provide—unless you take some action to stop it.

If you use a music centre, the Metrocare kit will help you keep it, your tapes, and records in mint condition. The permanent storage case contains a cassette head cleaner, head cleaning fluid, brush and cleaning spatula. For the record playing side there's the popular Groovemaster, the famous Metrocare Ioniser, stylus cleaning fluid and brush.

The whole kit costs £4.98+vat.

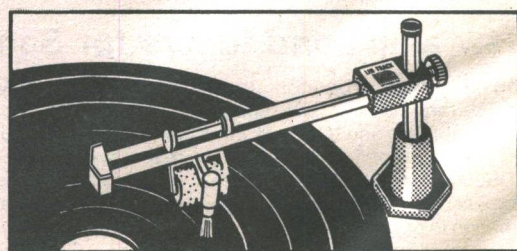
For turntables with low mass arms, the *Lin-track linear cleaning arm employs a new concept—simple but effective.

It is compact, with low mass (below 0.5 grams) and has a negligible effect on speed.

The independently pivoted brush tracks in the record groove at precisely the correct angle to clean out damaging grit and dust while the velvet pad picks up surface grime.

With minimum height and overhang, it will fit most turntables. At £2.98 inc.vat, it's a small price to pay for really clean records.

*Patent applied for.



Metrocare. More good sound ideas.



Thorens Metrocare Accessories
Metrosound Audio Products Ltd., Audio Works, Cartersfield Road, Waltham Abbey, Essex EN9 1JF. Tel: Lea Valley 712712.

Letters

Dear Sir,

I was interested to read the letter from an Australian reader on amplifier distortion and the sound quality not being related to distortion.

Many dealers and contributors to magazines have used the term 'musical' to an amplifier which sounds more realistic, more close to a real performance than another with similar distortion figures, both which may be very low indeed.

There are a number of ways in which an electronic circuit can distort a music signal and these are not fully understood by the engineers who design the circuits, because so long as amplifiers sound progressively better, we will not yet have the 'perfect' amplifier.

The most accepted way in which distortion is measured is on continuous sine waves, with the power amplifier driving a resistive load. But loudspeakers are very complex loads which may upset the stability of the amplifier and this is one factor affecting the difference in amplifier sounds. Other forms of distortion are intermodulation (sum and difference harmonics between two or more sine waves) and transient distortion. Intermodulation distortion can be measured between two sine waves, but requires more expensive measuring equipment. Transient distortion is more difficult to define, let alone measure. Square wave tests are a means of indicating transient behaviour, but how these relate to subjective opinions is not fully understood, though some experts have their own theories based on their own experience.

I have recently been doing some tests on a part of the circuit of typical amplifiers. I built three separate circuits, two of which were from published designs and the third a more elaborate version of one of the other two, but based on ideas gained from reading one of your previous reviews.

I then built a test box which could switch between the three circuits. At first, I could detect a slight difference between the third circuit and the other two, but was unable to say which sounded better. On the first occasion it took about 15 minutes to detect the difference between the circuits properly. This was when I put on a choral record. The result was a much greater definition of the stereo locations of the voices and instruments. Subsequent listening tests indicated that the more elaborate circuit, of a sort only found on very expensive amplifiers, did sound better, but only really noticeable on fairly complex music. And to spot the difference in sound required very high quality cartridge and loudspeakers and other amplifier circuitry.

Why did one circuit sound better? There must be a reason. Comparing the circuits, I realised that all would introduce extremely low sine wave distortion, but that the more common circuits (more similar to most commercial circuits) could introduce a form of transient distortion owing to the circuit configuration. Mathematical analysis is very complicated and although I have determined the equations for transient behaviour, I would not yet like to say which terms in the equations represent the distortion.

I also have formed an opinion that the effect of transient distortion is to confuse the position of a voice or instrument in a stereo recording. Harmonic distortion is unlikely to affect the stereo location because on each channel the distortion will be proportional to the signal. But on transient distortion, the distortion component will depend on the signal waveshape of the entire music at that channel, and distortion signal is unlikely to bear any relationship to the music signal. If we assume that the ear can detect the instruments and voices in a recording, it will hear each instrument/voice plus that part of the transient distortion which it attributes as part of each instrument or voice. As the transient distortion component is unlikely to bear any linear relationship to the signal, we can assume that the ratio of signals in each channel for a particular instrument/voice (indicating its stereo location) will not be repeated in the transient distortion signals. Hence the location of the transient distortion signal will be different from that of the instrument/voice, making the image position less stable.

Perhaps the best way to measure transient distortion in an amplifier is to carry out listening tests against a range of test amplifiers graded in terms of transient distortion. I wonder!
Graham Nalty,
(Hi-Fi Consultant)
6 Mill Close, Borrowwash, Derby.

Letters

Dear Sir,
Having taken "Hi-Fi for Pleasure" almost since its inception, I thought I would write to compliment and thank you for a generally excellent magazine. I preferred the style of the early H.F.P.s to that of the more recent ones — glossy paper, more and better illustrations, etc.; it did for hi-fi what "Vogue" does for fashion — but I am prepared to accept that the exigencies of publishing forced a change, and since then you have pioneered your excellent group comparative tests, and several other features, by way of compensation.

If I might turn now to a specific point, namely the choice of

facilities included in cassette recorders: as cassette technology has advanced, the number of "user-variable" (ugh!) facilities included in cassette recorders has grown like Topsy. The result is that, on paper, virtually all the machines in a given price range offer a monotonously similar list of features, as the various manufacturers compete frantically for the public's favour. I would like to plead for more choice in the combinations of facilities offered by machines in a given price range. This is particularly relevant to two specific features, as follows.

First, I would like to see at least one high-quality machine in each manufacturer's range offered without Dolby circuitry. It is surely economic madness for someone who requires both cassette and open reel recorders to pay for two separate built-in Dolby circuits, one in each machine, when he would obtain more flexibility, and in some cases better results for the same money, or less, by using both recorders with a single external Dolby processor. It is significant that most manufacturers of open reel recorders still offer several machines without Dolby circuitry, thus allowing the purchaser an option, and yet it is impossible to find a single high-quality cassette deck (made, in many instances, by the very same firms) without this feature.

Second, I feel that, of all the facilities which have been offered in cassette decks, the most under rated and sadly neglected of all is the auto-reverse facility. Some may scoff at this, and indeed, I do believe that it is something which has to be lived with in order to be fully appreciated. To the best of my knowledge, the only such machines currently on the market are the Akai GXC 75D and the Dual C901, both of which feature the ubiquitous Dolby. I am the proud possessor of a Sony TC-165, which also has auto-reverse, and which was on the market before either of the above products (which, incidentally, makes nonsense of the item on Page 46 of your September '74 issue, "From left to right, and conversely . . ." — I had thought, nay hoped, that the writer would have been verbally torn apart by some P.R. he-man from Pyrene House, but alas, it was not to be), and a really excellent machine it has been. However, after two and a half years of very hard use, its performance is starting to deteriorate, and in any case, it does not have the switchable bias/equalisation facilities required to make the best of the latest tapes.

So now I am looking for a new cassette deck with modern styling, bias/equalisation switches, auto-reverse, mic./line mixing and good tape transport,

but without Dolby. I do not suppose for one moment that I am by any means alone.

Yours faithfully,
C. J. Webster
Totnes, Devon

Letters

Dear Sir,

May I put the record straight about Shure's use of the spelling *quadriphonic*, mentioned in your August issue (p. 41), and the Oxford English Dictionary? Shure wished to use this form and asked us to agree that it was the correct spelling. Our comment was that if the word did not already exist in other spellings *quadriphonic* would be the best one to adopt, but that since *quadraphonic* and *quadrophonic* were so common it would be impractical to recommend it.

On other occasions when we have been asked to choose between *quadraphonic* and *quadrophonic*, we have recommended the latter.

Yours faithfully,
A. M. Hughes
Senior Editor (Science)
Oxford English Dictionary
Supplement
New Edition

Letters

Dear Sir,

I would like to thank you and all others concerned for the superb articles regarding loudspeaker reviews, these were much appreciated as was the earlier item on magnetic cartridge reviews.

On page 45 of the October issue reference is made to the Philips Motional Feedback speaker . . . "Philips have remained dormant recently with their motional feedback concept for loudspeakers". This surely is not the whole picture — could it be that the British hi-fi press has for some reason chosen to ignore Philips equipment in general?

Would it be possible for your magazine to publish a report on either the RH 541 or 544 MFB speakers together with the RH 551 pre-amplifier please?

Lastly I wonder if you feel that cassette decks have now had a thoroughly good airing by all concerned and a more balanced picture of the tape medium given by considerably increased coverage of open reel decks?

Notwithstanding the above criticism, thank you for a very good publication. Incidentally I have no connection with Philips whatsoever.
Yours sincerely,
M. Newman
Point taken — we shall endeavour to oblige — Ed.

Ultimate Fidelity deserves Ultimate Design

Few people would argue with the fact that LUX High Fidelity is Ultimate Fidelity and that LUX engineers have reached the highest point of technical perfection that today's technology allows. Not only have they achieved the high technical specification that is expected of them, their research into the subjective elements of good sound, regardless of what the measurements indicate, has allowed them to achieve results not possible a few years ago. Today these are the "norm" for a LUX product.

This ultimate sound technology deserves a matching aesthetic design philosophy, and one can easily see to what a high degree this has been achieved with LUX's 'Top Set' as illustrated. Each individual feature has been carefully designed to blend with the general appearance and is thus not only pleasant to the eye but highly functional.

This careful blend of Science, Sound and Design is what goes to make up LUX ULTIMATE FIDELITY.

C1000 Pre-amplifier

This unit is packed with useful facilities which only a full brochure can adequately describe, and its technical specifications are 'state of the art'. Intermodulation distortion is 0.007% at 2.5v from 20Hz to 20,000Hz. Phono input overload is more than 400mV at 1000Hz and 3.5v at 20,000Hz. High & low filters, turnover frequency selector, touch-mute switch, speaker system switching, input level controls, and dubbing are just a few of the available facilities.

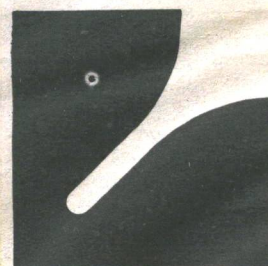
Power Amplifier

Three power amplifiers M2000, M4000 and M6000 are available at 120, 180 and 300 watts per channel respectively, into 8 ohms, continuously driven from 20 to 20,000Hz at no more than 0.05% total harmonic distortion. The unit shown is the M4000. All these units have both VU meters and LED peak level indication. Four protection circuits are able to sense DC drift, power transistor failure, abnormal high temperature, and excess current.

T110 FM/MPX Tuner

The tuner has a useable IHF sensitivity of 1.6µV and stereo separation at 1000Hz is 48dB. Its super slim design has several unusual features including a dial scale placed inside the large tuning and signal strength meter.

Full technical details on this and the other Lux models depicted can be obtained on request from Sole UK Distributors: Howland-West Ltd., 3-5 Eden Grove, London N7 8EQ. Tel: 01-609 0293/4/5.



ADVICE ADVICE ADVICE

At present I own a Sony tuner-amplifier, delivering 12 watts per channel into Sony SS5177 loudspeakers. These have a woofer, midrange and tweeter to each cabinet. I am thinking of changing these speakers for an English make — namely Mordaunt-Short Festivals, series 2. The series 2 has only two drive units to each cabinet, and my question really is whether this matters. Would the Festivals give me better quality sound than the Sony speakers? Would I lose out on the bass and treble? My room size is 14ft x 15.6ft; 10ft from floor to ceiling.

I am shortly to purchase a Rotel 402 tuner-amplifier.

M. J. Andrews,
Torquay

Looking at your system as a whole, there is little doubt that better overall sound will result from incorporation of the Mordaunt-Short loudspeakers. Certainly there is no rule that dictates that three speakers within a cabinet will produce better overall sound quality than two — and in fact more often than not a twin-speaker system will produce far better mid-range than any other. What can suffer is power handling at the

extremes of the listening range, but rarely does this matter very much, and certainly not in your case.

Especially as you intend to go up the rung with a new tuner-amplifier capable of delivering more power, then we can endorse your choice with confidence. You may find the speakers less punchy at the bottom end, but you will not be losing much except, perhaps, a little efficiency. This it seems you will soon, however, repair.

Have care, incidentally, if you plan to buy a turntable and pickup cartridge. Your new system will be complemented by a good combination, which will probably cost at least £70.

I am at present the owner of a hi-fi system comprising a Pioneer PL12D-II record deck, Goodmans Mezzo speakers and a Teleton 'Matsi' tfs70 receiver. I now wish to add to these a Dolby cassette deck, and have considered several decks such as the Trio KX710, Pioneer CTF2121 and CTF6161, Akai GXC310D and the Aiwa AD1300. I would be glad of your advice on the most compatible and

best value deck for my particular system, or indeed if you could suggest a more suitable choice. My price limit is £130.

J. H. Avery

There are two excellent value-for-money cassette decks I can thoroughly recommend in your price range — they are the Aiwa AD1300 and the Pioneer CTF2121.

There isn't very much to choose between the two; both are compatible with your pre-amplifier and both perform very well. I have a preference for the Aiwa, mainly on account of the three-way switching for tape selection and the obviously high standards of construction, but you won't go far wrong whichever you choose. Take a look and see what you think.

Recently, at a closing-down sale, I bought the following: one Sansui 636 cassette deck, two Leak 600 Sandwich speakers, one Sansui AU2200 amplifier.

A friend of mine tells me that the cassette unit and speakers are excellent, but that the amplifier is

not suitable for the speakers. I would therefore like to know what amplifier would be suitable (please name a few and choice is limited in Ireland), and what tuner-amplifier would suit if I decided to get a receiver instead of a plain amplifier? As is obvious, I know nothing about hi-fi. I am learning from your magazine.

J. D. Liddane.

If you are happy with the performance and sound of your system, then I would suggest that you politely ignore the advice of your friends and enjoy the sound.

It is true that the amplifier is under-powered for the speakers, but in a small to medium-size room and provided that high volume levels are not required, this combination should be satisfactory. If you find the volume adequate, then cease to worry.

If you do decide to purchase a higher-powered amplifier you may care to look at the ranges of Yamaha, Technics, Pioneer, Sugden, Rotel and Denon. Tuner-amplifiers provide better value for money than the separate units, and for a suitable model I would suggest Yamaha, Technics, Pioneer, Rotel and Aiwa.

ADVICE

We can help you with your Hi-Fi problem. For a personal reply print your question below and post this form to 'Advice', Hi-Fi For Pleasure, Spotlight House, 1 Benwell Road, Holloway, London N7 7AX. Please enclose a cheque or postal order for £1, and a stamped, self-addressed envelope



The only way we could make this turntable for £287 was to put less into it!

The world's first computerised turntable

Until now, turntables have relied on more and more mechanical ingenuity to maintain the highest standards of sound reproduction.

The ADC Accutrac 4000 is so simple in comparison, even the most expensive turntables suddenly look clumsy, complex and old-fashioned.

The fact is, truly superb sound reproduction can now be achieved in a much simpler way.

The motor that keeps an eye on itself

We replaced the standard belts, wheels and pulleys with a direct drive system to gain optimum freedom from rumble, wow and flutter.

This system has electronic speed-sensing circuits within the motor itself, which keep a constant eye on the accuracy of the 12 inch diecast turntable's speed, and instantly corrects any error.

The turntable with a memory

Out came thousands of transistors, diodes and other standard components.

In went the latest breakthrough in MOS computer circuitry.

So all the ADC Accutrac's automatic operations are controlled and programmed far more quickly and efficiently than any other automatic turntable.

The control panel is designed for you to select up to 13 tracks in any order you want to hear them, and a 24 selection memory bank allows for programmed repeats.

The cartridge that knows where it's going

Once you've selected your programme, you experience something quite spellbinding. The ADC LMA-1, the most advanced cartridge in the world, scans the surface of the record with a tiny beam of infra-red light. This system ensures that the tonearm selects the programmed track quickly and smoothly while accurately sensing where it begins and ends.

The tonearm you never touch

We did some more eliminating.

Out went the noisy linkages that power automatic arms from the main turntable drive motor.

Instead, the ADC Accutrac's tonearm is

moved by its own electro-optically controlled servo-motor, automatically decoupled during playing.

It responds instantly and silently to your programme in the turntable's memory bank.

It's all at your command

You can operate the ADC Accutrac by remote control.

It comes complete with a cordless command module and sculptured space-age receiver.

This helps you to sit back and enjoy what we hope you'll agree is its main attraction: the sheer excellence of the sound reproduction.

ADC Accutrac 4000 £287 inc. VAT.
Guaranteed for 2 years.

ADC Accutrac 4000TM

The turntable that's revolutionised hi-fi.

Distributed by BSR Limited, Powke Lane, Cradley Heath, Warley, W. Midlands B64 5QH.

Lo-Down on Hi-Fi SPECIFICATIONS-

*A Revolution in Price
A Revelation in Performance*

The New
1933

**ORMOND
MOVING COIL
LOUDSPEAKERS**



The ORMOND Permanent Magnet Moving Coil CHASSIS

What was a luxury possession becomes purchasable by all! Naturally, it fell to Ormond to produce this marvel of value. This speaker has an excellent frequency response giving naturality. the maximum sensitivity. It is fitted with a pressed steel chassis and moulded cone, with large permanent magnet, to give reliability with long life. Complete with output transformer.

26'-

Overall size:
Diameter 8 inches,
Depth 5 1/2 inches.
Cat. No. R/494.



The ORMOND Moving Coil CABINET LOUDSPEAKER

Contained in a handsome figured Walnut cabinet of modern style, it is fitted with the Permanent Magnet Loudspeaker described above.

40'-

Size:
Height 14 1/2 inches,
Depth 8 inches,
Width at base 15 1/2 inches.
Cat. No. R/495.

THE ORMOND ENGINEERING CO., LTD.,
ORMOND HOUSE, ROSEBERY AVENUE,
LONDON, E.C.1.
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More on frequency response

Those long suffering readers who read last month's piece will be aware of the importance of frequency response. If the response of a system isn't flat, in other words if some frequencies are emphasised relative to others, the 'tone' of musical instruments will be altered. Some may, in extreme cases, disappear altogether.

Frequency response deviations are measured using the Decibel (dB), which isn't a unit in the way a pound or a ton is; it simply tells us the *difference* between things. If a piece of equipment has a frequency response characteristic that shows it to be 6dB down to 40Hz relative to, say 1kHz, then it will only produce half as much power at 40Hz.

So much for the theory — it's now time

to relate theory to practice in the form of frequency response specifications.

Once again I need, unfortunately, to underline the fact that the most important job of a specification is to help sell equipment. Whilst some companies do indeed publish specifications that are models of informativeness, others use a number of

techniques to present their products in a favourably biased light.

The most common of these, referred to last month, is producing a frequency response that reads, '30-20,000Hz'. You'll notice there are no dB limits — the equipment might be absolutely flat from 30-20,000Hz, then again it might be 30dB down to 30Hz and 20Hz! After all, with a specification like this, all the manufacturer is claiming is that this product *will* respond to all frequencies in the specified range: there's no mention of how *well* it will respond.

Lo-Down on Hi-Fi

If you think the example above is exaggerated, let me assure you it isn't. I've measured cassette decks claiming a response to 18kHz, and more than one or two such machines were 6dB down at 14kHz and well over 20dB down by 18kHz.

You'll find this kind of uninformative rubbish used not just for cassette decks. Pickup cartridges often come with the most amazing claims, and speaker manufacturers have been known to join in the game.

Rather more helpful is a specification that reads, "30-20,000Hz ± 3 dB". Now we know how accurately the product responds to different frequencies.

Or do we? Take a look at Figures 1 and 2. They're both for products with a claimed response of 30-20,000Hz ± 3 dB, and both achieve this specification. But look at the difference in their response curves — there's no doubt that, on frequency response at least, the product in Fig. 2 is clearly superior to that in Fig. 1.

So, what we need are not figures but curves, because only curves tell us the response of the equipment at *all* frequencies. Curves can, indeed, be helpful, but need careful interpretation.

Amp manufacturers often produce ruler-flat curves, but these are based on the high-level or 'flat' inputs, such as auxiliary or tape. The input for a turntable includes special equalisation to correct for the way the frequency response is 'bent' when records are recorded. This is done to a standard defined by the Record Industry Association of America (RIAA). If the phono equalisation stage of an amplifier doesn't follow the RIAA standard, the overall frequency response on that input will not be flat. So you could have two amps with identical responses on high-level inputs, but noticeably different response characteristics on their phono inputs. You'll often find this specified under 'Deviation from RIAA' or simply as 'Phono input response'. How important this parameter will be depends on how much of your listening will be done using records.

There is currently a good deal of argument over the importance of frequency response measurements on loudspeakers. What can be said with certainty, however, is that you should not base the purchase of any speaker on its frequency response specification. The performance of a speaker is modified, usually dramatically, by the room it is used in, and when measurements are taken the speaker is placed in an acoustically 'dead' room, called an anechoic chamber. Since such a room, theoretically at least, produces no reflections of sound to alter the frequency response measurements, the resulting curve will bear almost no relation to

curves taken in a 'real' listening room.

Even in the anechoic chamber problems of measurement can arise. Each anechoic chamber has its own frequency response which affects the final curve — so you need to be careful about making critical comparisons unless you know that all the speakers involved were measured in the same chamber. The position of the measuring microphone is, to say the least, critical: moving it even an inch or so can result in a totally different curve.

My own view and, so far as I know, that of a majority of manufacturers, is that speaker response curves are best regarded as a designer's tool. They need careful interpretation, based on years of experience, and are more likely to mislead than inform if they are studied casually.

You needn't fear that a speaker claiming 60Hz-20kHz ± 5 dB is any worse than one specified as 35Hz-20kHz ± 4 dB. Apart from the fact that frequency response is only one of many parameters that affect the overall sound of a speaker, measurements such as those above only tell a small part of the frequency response story.

Remember my observation that moving the microphone slightly produces different results? This arises because speakers are fairly directional in their output — even so-called 'omnidirectional' designs. Some manufacturers produce frequency response curves to show how the fre-

quency response changes in different positions, and a curve of this type is known as a polar diagram (Figure 3). Here the speaker's position is represented by the centre of the circle. 0° is directly in front of the speaker, 180° directly behind. Output is measured, as normal, in dB's, these being shown for each position by the smaller circles. Three frequencies are usually plotted, and changes in output in different positions are shown by the dotted lines.

Polar diagrams go hand in hand with conventional 'on axis' response curves, and again, unless you're sure you know the pitfalls of the technique, you'd be wise not to let polar diagrams influence your buying decision.

So far we've made the assumption that the frequency response variations we measure at one input level remain the same at other levels. This is certainly true for amplifiers and tuners, and for practical purposes it's also true for speakers and pickup cartridges.

However, when we come to consider tape decks, particularly the cassette variety, this is an assumption we need to throw out of the window. The problem is that as the recording level is increased the tape becomes overloaded or saturated at high frequencies before it overloads at lower frequencies. Because the narrow track widths of cassette tape create noise problems, it's essential to record at as high a level as possible if the wanted

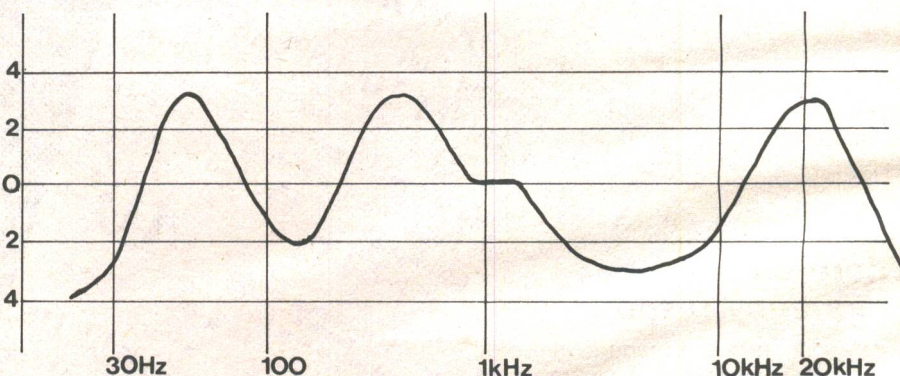


Fig. 1. Deviation of ± 3 dB between 30Hz and 20kHz.

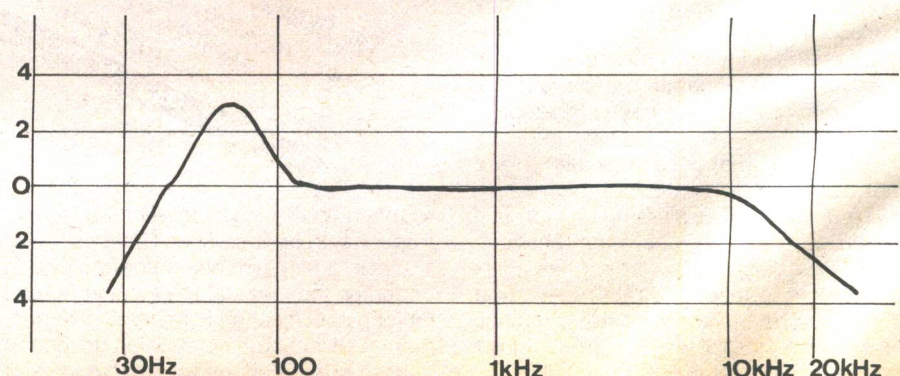


Fig. 2. As Fig. 1, but a different product with same tolerances.

signal isn't to become lost in unwanted noise. In practical terms, 'as high a level as possible' means we're recording well into the zone where the system can't cope with the high frequencies.

Figure 4 shows the frequency response curve for a fairly good cassette deck, and up to 14kHz the response is quite well maintained. On paper this looks better than the machine whose response is shown in Figure 5, but once again it is not as it seems.

There is a convention that says cassette deck frequency response curves should be taken at a level 20dB or 24dB below the nominal 0dB recording level shown on the meters, whichever level is chosen is shown as 0dB on the finished curve. This is, shall we say, a 'convenient' convention, for most cassette decks can put up a reasonable showing at these levels — they're below the point where the system runs into trouble with high frequencies.

If we were to plot response curves for cassette decks at a recording level of 0dB, an average deck would produce something like the curve in Fig. 6 — depressing, isn't it? Assuming that Fig. 6 is based on the same machine as Fig. 4, and that Fig. 7 represents the 0dB response of the machine shown in Fig. 5, it's no longer so easy to say which deck is better. At 0dB recording level machine B gives superior results, but down at the -20dB level machine A comes out on top. This is an aspect of performance you don't often read about in manufacturers' specifications, so you'll have trouble comparing different products. I mention it to underline, yet again, the dangers of succumbing to the game of 'specmanship', a game a little like gambling in that those who set the game up choose the rules carefully.

Occasionally, frequency response is specified as, for example, 40-20,000Hz (DIN 45500). DIN stands for Deutscher Industrie Normen, an organisation roughly equivalent to our own British Standards Institute, and they have laid down certain standards for frequency response, along with other aspects of hi-fi equipment performance. There's nothing wrong with this as far as it goes, but unless you've got a copy of the DIN standards handy, you're not going to get very far in assessing performance. Manufacturers, particularly European ones, seem perfectly happy to publish specifications such as the example above, but their literature never includes an explanation of what the DIN standards mean. Helpful, no?

Actually, you're not much better off if you do know the standards for the type of equipment involved. They're of the '+ or - so many dB's' type, and as we already know (Figs. 1 and 2) such specifications can conceal a response curve as rough as Somerset scrumpy.

I wouldn't go so far as to suggest that you ignore frequency response specifications entirely, just that you bear the dangers of comparison in mind. Very often it isn't what the specification tells you that matters, it's what it doesn't tell you that's of greater importance.

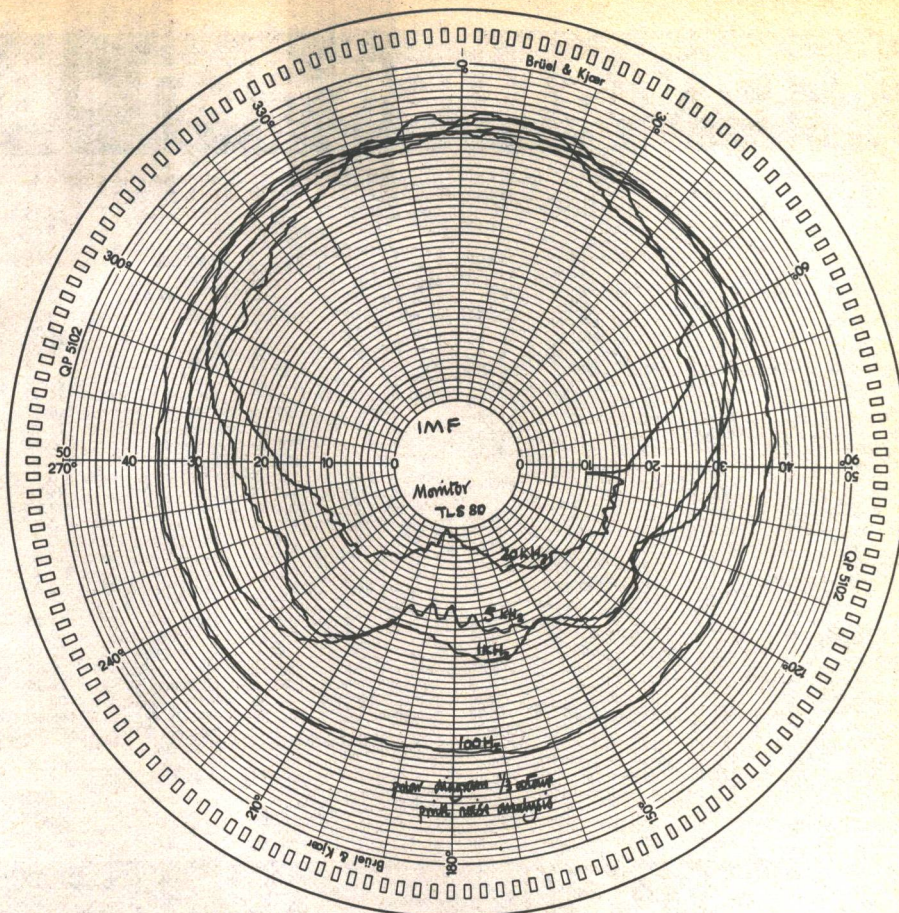


Fig. 3. A typical polar diagram (not an Arctic Circle!)

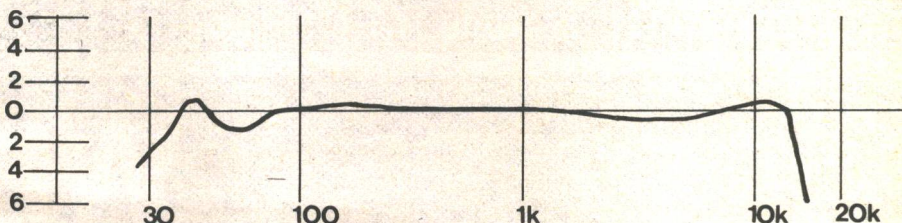


Fig. 4. Response for deck A.

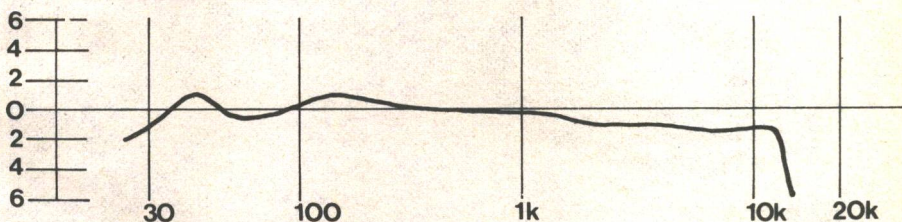


Fig. 5. Response for deck B.

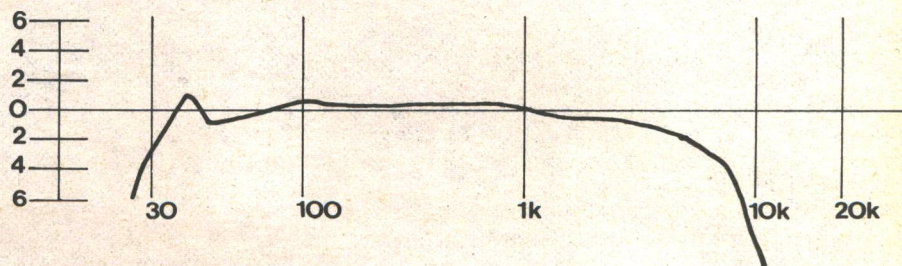


Fig. 6. Curve for deck A taken at higher recording level.

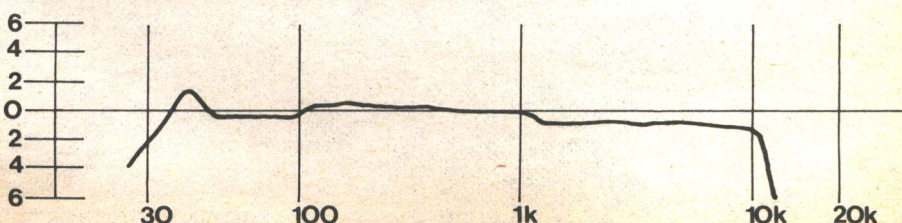


Fig. 7. As Fig. 6 but for deck B.

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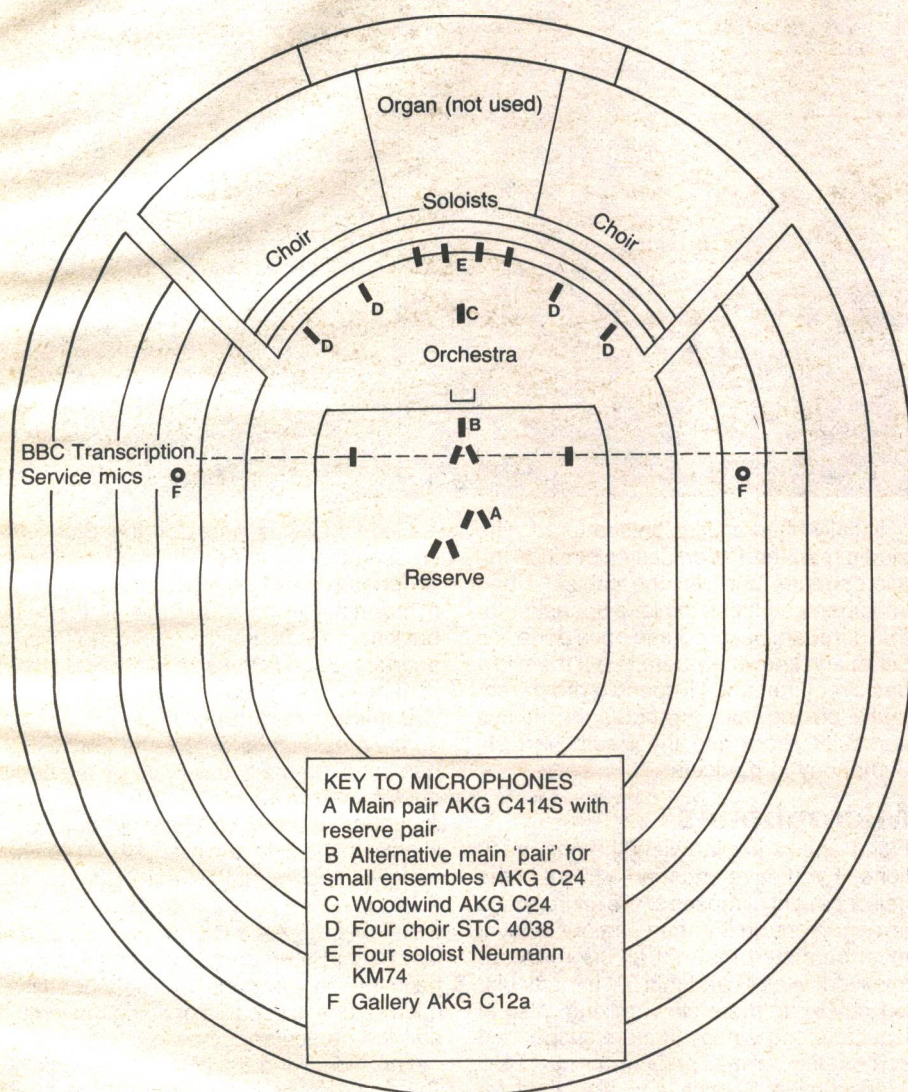


Fig.1 Microphone layout in RAH

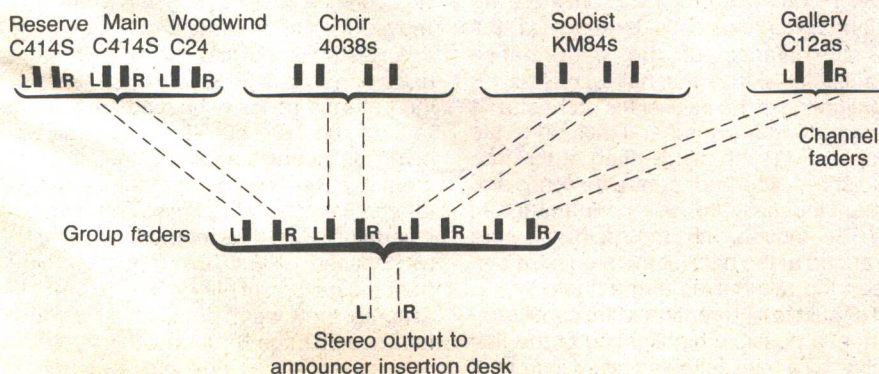


Fig.2 Microphone grouping on mixer

M.G. Skeet visits the Royal Albert Hall for a Proms rehearsal

Listening to music at home, I am usually more pleased by a live or recorded broadcast concert than a disc record. My bias has, I think as much to do with the sound of records, as a production, as with thoughts of spontaneity of a performance before an audience. I don't believe the question of which pick-up I use is really at the centre of it — it's something to do with the disc sounding the same each time I hear it. With a broadcast, it might well be the third time in the year that the particular composition is being heard, but it will be different interpretively and probably technically.

Of course the two media exist side by side — broadcasting organisations make use of disc records in their programming, but there remains for me the attraction of the real broadcast.

I was recently able to stimulate my bias by attending the rehearsal for a large scale broadcast live concert. The object of reporting this is to pass on some of the BBC's special techniques behind broadcast music, assuming, of course, that three hour sitting-in has given me a typical impression.

The scene

The occasion must be classed as grand: it was the penultimate night of the Proms with the BBC Symphony Orchestra, BBC Singers and BBC Choral Society conducted by Raymond Leppard in London's Royal Albert Hall (RAH). The main work on the programme was Beethoven's 9th Symphony.

I had of course listened to many of the previous concerts in the current and ear-



lier seasons. I'll also admit to refreshing my ears by attending two earlier concerts and it was being present that prompted the rehearsal visit — could all those microphones actually be in use — and what determined the choice of those that were? There and other questions I might be able to discuss with the BBC Studio staff.

The RAH is an Outside Broadcast (OB) venue. Such are the number of relays from this hall, however, that there is a 'permanent' installation centred on a 24-microphone channel mixing desk by Calrec. This comprises standard OB modules and as such could be temporarily extended. Space prevents this desk being installed within sight of the activities in the hall itself, so it is set up in an upper room. However, overlooking the stage are two very small rooms which control commentary insertion on the mixed output from the upstairs control room. One of these rooms is used for the R3 network and the other can be used for overseas feeds.

A typical Prom sound broadcast is handled by three studio managers with an engineer in attendance. One studio manager has the overall mixing responsibility and works the Calrec desk upstairs, a second handles the commentary inserts and the third acts as liaison on timing, any necessary script updating and general smooth running.

Procedure

I was to meet the studio manager, Geoffrey Parker, who would 'mix' that evening's broadcast, and also a colleague Michael Lucock. I am indebted to them for allowing me to see and discuss their preparation activities.

Initially I had an illusion shattered. The studio managers themselves position the microphones and run the cables! I had imagined countless minions set aside for that purpose, but of course once done, it's done, and knowing where to put them is a basic requirement. I'll spend more paragraphs on the mic. arrangement for this particular Prom and the Beethoven 9th Symphony in particular.

Microphones

Fig. 1 shows in plan view the mic. positions. If you have attended a Prom in the hall or caught glimpses of the microphone arrangement on TV then straight away it must be stated that not all the mics are involved with R3 and that TV in particular is likely to do more close miking. Also at least four of the mics that are suspended across the arena belong to the BBC Transcription Service and are used for selected Proms which this organisation sells abroad. The latter are shown dotted in the diagram.

So to generalise, for this Prom there are four basic balance considerations: (1) the overall balance of the performance against (or with?) the hall acoustic; (2) highlighting of the back of the orchestra, ie the woodwind; (3) general pick up of the choir and (4) the highlighting of the four soloists — soprano, contralto, tenor and bass. Unusually, for this performance of the Beethoven 9th the soloists were arranged at the back of the orchestra between the two halves of the choir.

I should really mention a fifth consideration — a possible highlighting of the first violins by a mic. suitably placed in front of this section. I'll return to this possibility later.

Good news is here for the Blumlein crossed pair devotee. The main balance is done on a pair of AKG C414 capacitor microphones some 30 feet (9 metres) back from the conductor above the Promenaders. Such is the size of the RAH that distances are difficult to judge. The point was made to me that this miking alone can sometimes suffice when the orchestra has been internally balanced by the conductor. As the C414s are the main microphones there is a back-up pair just slightly to the side and rear. All C414s are used with figure of eight polar diagrams.

When the programme is a small ensemble the AKG C24 stereo capacitor just behind the conductor's position can be used as the main microphone. This microphone is capable of being moved to suit the particular occasion.

The woodwind section at the back of the orchestra is highlighted by the AKG C24 suspended just in front. This looks closer when standing on the stage than it had at previous Proms when viewed from an audience position. Possibly it had been moved for this or other concerts.

An established method of capturing a hall's acoustic is to have a backward facing pair and possibly spaced pairs at the rear of the hall, but since the hall was given its famous saucer acoustic treatment by Kenneth Shearer an effective alternative is usually in use. That evening it certainly was. The method is to employ two spaced AKG C12A capacitors high, near the gallery, at either side of the hall. I assume they were pointing downwards for I couldn't see them, but this is of little consequence as they are switched to omnidirectional pickup pattern anyway.

To my ears, when the pick up of the



various mics was individually demonstrated the two gallery mics make a satisfactory contribution to hall acoustic pick-up, although I'm told the presence of the 7000-or-so audience really soaks up the sound.

The programme that evening had the chorus plus soloists' contribution to the last movement of the Beethoven 9th Symphony. Four of the ubiquitous STC 4038 (now Coles) figure of eight pickup ribbon mics were placed on 44 metre floor stands in front of the tiered choir. But to surprise you I can disclose that the first time the balance of the choir could be checked was in the 4th movement of the symphony on air that evening! Only a token few of the total choir could attend the rehearsal — presumably the BBC singers — the BBC Choral Society being an amateur body and as such the members are out earning their living during the day. The four soloists were in attendance and each had a stand mounted Neumann KM74 capacitor in front of the singing positions. These at first seemed surprisingly close — but this was apparently dictated by the step positions on which the soloists and choir stand and the need to keep the rear pickup of the KM 74s away from the orchestra brass section.

I was fascinated, incidentally, by one interesting sidelight on professional microphone usage — the mics that I was able to have a close look at appeared pretty well physically beaten up! Perhaps I shouldn't keep my own mics in cotton wool anymore!

Mixing

The Calrec mixing desk is situated in a small, almost square, room. Out front,

away from the room corners, there are the two BBC monitor speakers of the LS5 family, driven by Quad amplifiers. A heavy hessian-type curtain curls around behind the speakers, down the two sides of the room, and moreover there is substantial surface acoustic treatment on the facing upper parts of the two side walls, presumably for standing wave elimination. Certainly the monitoring quality is not room dependent.

The visual monitoring is by twin pointer Ernest Turner PPMs. I'm tempted to write 'like I use at home', but should of course express it as, 'mine being like those at the RAH'. The microphones are connected via a large jack field and can turn up where desired on any of the 24 mic. channels on the mixing desk. So that a balance between the four requirements already mentioned can more easily be maintained the various related microphones signals are grouped and connected to further faders on another part of the desk. Fig. 2 shows the routings of the particular microphones in use at the Prom I attended.

The Studio Managers involved in BBC music broadcasting have musical backgrounds, not engineering backgrounds. Often, however, they are described as balance engineers. From my brief visit I see their job as collaboration between the sound mixer and the musical forces, a way of transporting the musical sound from one place to another, be that second place a high quality set up or a portable radio in a car or kitchen. The mechanics and electronics involved are simply a means to an end. Indeed it was put to me that if these various 'means' show through then they consider that they have failed.

The rehearsal as seen from the upstairs control room did not mean any particular noting of levels, marking up of the musical score or anything other than a quick check on which actual positions the soloists had actually taken and that their mics were correctly phased. Later on, just before the broadcast the music staff would know the disposition of the choir. A CCTV set up is used to given a general view of the hall with the aid of some pan and tilt remote control.

The monitoring quality after this first link in the chain was typically excellent. However, maybe some years ago I would have wanted to take the BBC monitors home. That evening, listening at home, I was pleased to find that I was very satisfied with my own set-up.

The result

The musical effect I found fully satisfying, but then I am biased towards concert relays. The hall sound, of course, was distinctively conveyed (could it be the gallery C12As?). Knowing that the soloists mics were close, I had to note the actual balance that came over for the striking bass entry that starts the choral part — it was a highlighted soloist, but definitely one in the RAH.

Such is the way that the BBC studio managers do things on these occasions, our parting words at the end of the rehearsal were, MGS, "Oh, will you be using the 4038 mic. that you have just placed near the first violins?" GKP, "I'm not sure — might need some detail — I'll see tonight." I listened and, of course, I wouldn't know if it had been used or not — nor the AKG BX20 echo unit that I saw lurking in the upstairs room.



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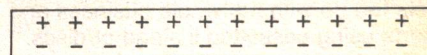
STATIC MUST GO

Adrian Hope
attempts to
solve this
sticky problem

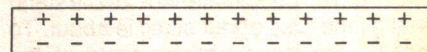


What it's all about

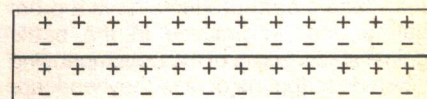
How objects gain a static charge



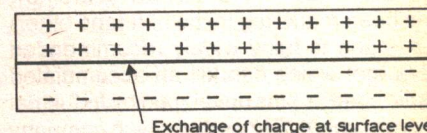
Neutral objects (each with similar numbers of, and thus electrically balanced, particles of opposite charge)



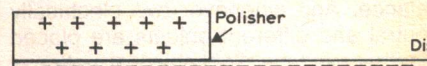
Bring them together . . .



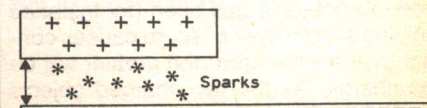
and their surface contact causes an exchange of charged particles to leave each object with a charge.



Use a larger object (such as a gramophone record) to increase surface area and actively rub one object over the other (as in cleaning a record) and the charge increases even further.



When the objects are pulled apart their opposite charges try to hold them together and sparks may even jump, with an audible crackle . . .



The charged disc (usually negatively) now attracts any positively charged dust particles in the air, like a magnet attracts iron filings . . .

This was to have been an article on how to clean records. It ended up mainly as an investigation into static — what it is, what causes it and how to get rid of it. The change of horses midstream wasn't really so surprising. Static is the single biggest cause of dirt on discs, and if you can lick that problem the rest is easy. Unfortunately it is anything but easy to lick the static problem.

Consider first what is obvious to anyone who has ever owned a gramophone record. When the record collects dirt or dust, for whatever reason, the natural tendency is to polish it clean. But, as every schoolboy knows, polishing plastics creates an electrostatic charge in them, which attracts light objects; and the air is full of the lightests of all objects — dust. So once cleaned, a gramophone record (which is of course made of plastics) collects more dust and gets dirty again and needs cleaning again, and so on and so on, *ad infinitum*; or at least until the user gets fed up with the whole business and starts using cassettes instead of discs.

But static is unpredictable. Some people suffer from it far more than others, and need no reminder that some commercial air conditioners rely on an electrostatically charged object to clean the air by attracting all the dust it is carrying. On the other hand, other people cannot understand what all the fuss about static is about. To confuse the issue further, some of the written descriptions of static, its cause and cure, are woefully misleading. For instance — although the whole range of Watts record care products have a great deal to offer in practice in the battle against static, some of the accompanying written descriptions of how they work are both confusing and inaccurate.

One of the leading British authorities on the whole business of static is Professor Philip Secker, of the University College of North Wales at Bangor. The Zerostat anti-static gun that for several years now has been marketed in the hi-fi (and other) fields and is fairly widely recommended as a tool which can kill an accumulated static charge, was developed by Industrial Development (Bangor) to which company Prof. Secker is attached. But more of the Zerostat later.

An object, be it a gramophone record or anything else, builds up a static charge when some of its molecules lose or gain charged particles or electrons because this upsets its normally neutral electrical balance. And whenever two electrically neutral and different objects are placed together even the slight physical motion of just placing them together will create a slight transfer of charge from one object surface to the other. This creates an electrical imbalance and opposite charge on each.

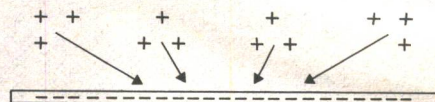
The greater the area of contact between the objects has been (for instance rubbing a cloth over a record causes contact over a wide area) the greater will be the charge. As the two charged objects are pulled apart, the voltage difference between them increases and may cause a visible spark. And because electrically unlike charges attract, so one will tend to cling to the other. This is why a nylon shirt

tends to cling to the body of the wearer who is taking it off and then produce sparks that are visible in the dark as it is finally pulled off. Under normal circumstances each object ends up with its own individual and opposite charge.

The magnitude of charge produced can be very high. For instance, when you walk across a nylon carpet, scuffing your shoes, to the static charge build-up can raise your potential to at least 10,000 volts. Under very dry conditions the potential can reach 40kV which escapes to earth as a very unpleasant spark if you then touch a metal earthed object. (Incidentally, the way to avoid the familiar, uncomfortable experience of feeling a spark jump from your finger is to discharge yourself to earth through a metal object such as a key — the spark then jumps from the key to earth, with little discomfort.) But static is a fickle thing, and the practical result of a charge is not always the same. For instance, a body charge will leak away very quickly through a wood floor which, although of very high electrical resistance by normal standards (10^9 ohms per square) is a reasonably easy path for a high voltage static. On the other hand, a modern nylon carpet with a resistance in the order of 10^{14} ohms per square will virtually isolate the human body from earth and leave it carrying the charge until it either jumps to earth or leaks away to earth via moist surfaces or even through the air. How easily it can leak away depends entirely on the humidity of the air, this being a gauge of the amount of moisture contained in the air, and thus also a gauge of its effective electrical resistance and ability to make surfaces moist.

All this helps to explain why it will sometimes be easy to build up a potentially uncomfortable static charge in a nylon-carpeted room but on other occasions (for instance if it is raining outside and humidity is high) there will be no noticeable problem. It also explains why some people suffer far less from dust-collecting discs than others. If you live in a flat with low relative humidity (say 20%), for instance if you have a centrally heated flat without artificial humidification, every time you charge up a gramophone record by cleaning it the charge will remain rather than leak away. Also, any record cleaning gadgets that run dry on the record while it is playing will tend to keep the charge up under such circumstances. On the other hand, if you live in an airy flat or have artificial humidification to ensure that the level of relative humidity never drops below about 60 per cent, the charges inevitably created in a disc when you clean it will more readily leak off. There will also now be less tendency for cleaning gadgets working dry on the record during playing to produce a high level of charge. You can, by the way, here take a valuable tip from experienced electronics engineers, whom you will notice always indulge in the habit of breathing lightly on every plastics or glass dial surface after polishing it clean — breathing lightly on a charged surface deposits a tiny film of moisture on that surface, and this helps leak away any charge. It is thus, if you can

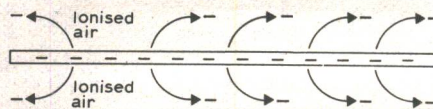
What it's all about



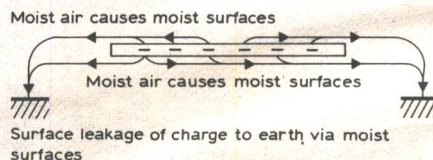
So the net result is a disc that attracts even more dust every time it is cleaned!

How the charge on a disc may be removed or concealed

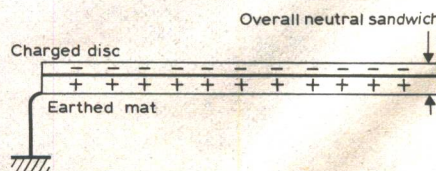
The air around it may be ionised en masse (for instance using radioactivity or ultra-violet radiation) to provide an electrical leakage path to earth.



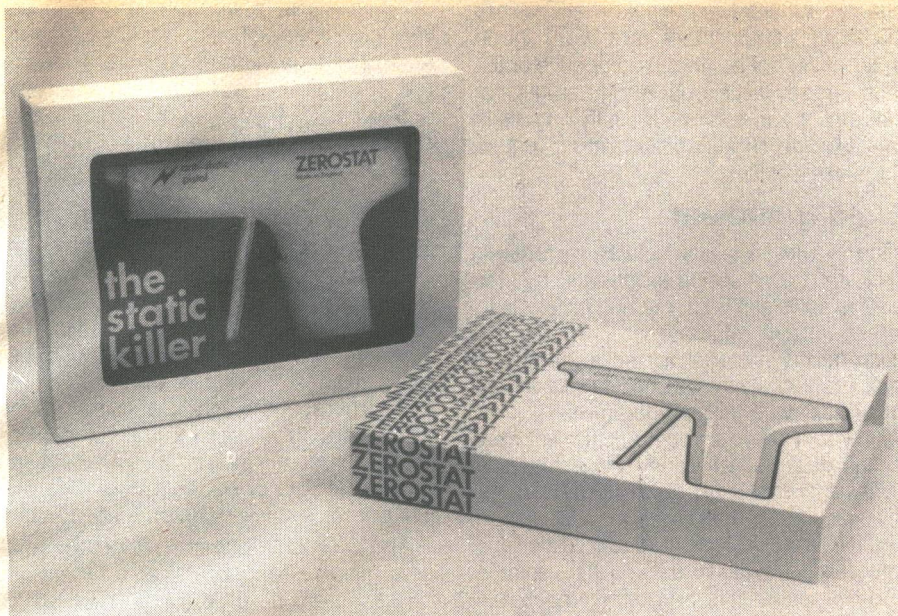
But this is usually dangerous. The safe, cheap and often natural answer is to leak the charge off through surface moisture acting as an electrical conductor to earth.



The charge may be "hidden" by putting the record next to an earthed conductive mat which takes up an opposite charge to produce an overall neutral combination.



This is the principle on which the EMI mat works — when the disc is removed, the temporary mat charge returns to earth.



get in the habit, a good idea always to breathe lightly over a record whenever it has been cleaned. Also, if the instructions accompanying a gadget for use on a record while it is being played (such as a Watts Dust Bug) recommend slight dampening of a pad in contact with the record, be sure to follow those instructions to the letter.

Prof. Secker compares cleaning a record to using a mini-static generator machine, which efficiently produces such a high level of charge resulting in surface potentials in the order of 8 or 10kV, that it drags any oppositely charged dust out of the atmosphere like flies to fly paper. With this in mind, Prof. Secker, like me, wonders how it can be that gramophone records are still pressed from plastic material that is so adept at gaining a static charge, while nylon carpets can be freed of static by spraying them with a material that renders them conductive, and there are many antistatic additives which can be used at the time of manufacture to keep the end product of plastics charge-free. After all, you don't often see food packed in plastics bags in supermarkets covered with dust, even though they have had every opportunity to accumulate a static charge!

I asked three of the leading record pressing plants in the UK how it is that records are still made of static-prone material. Decca confirmed that over the years they have tried adding various antistatic materials to the pressing mix and have spent a considerable amount of money on trying to find the right material. Unfortunately in Decca's experience the side effects created, mainly extra surface noise caused by the additive, are worse than the problem of static. There are currently no plans at Decca to release any more such discs.

EMI have likewise been experimenting for many years, trying to find the right additive to kill static. As they point out, it isn't just a problem for the user — it's a problem in the factory as well. For instance, putting a record into its sleeve is far more difficult if the record is charged and clings to the sleeve. EMI did in fact release whole batches of antistatic

records in the mid-1960s, but were generally disappointed with the non-reaction from the public. Presumably this means that the public neither complained about excessive surface noise nor congratulated EMI on static-free records. It would be interesting to see what happened today if a new batch were released.

CBS gave a 'resounding yes' to my questions about whether they have any interest in static free mix discs, but also cited experience with problems over increased surface noise from static-cure additives. Reliable word has it that over the last few months CBS have tried out another new "wonder additive", this time from France, but found that it too wasn't up to scratch.

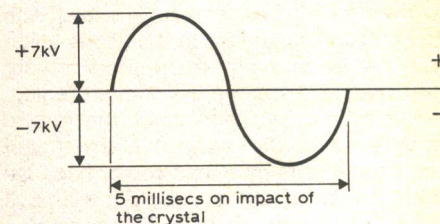
Although there is no doubt that if man can get to the moon (and back) he can certainly also find an additive for record pressing that kills static but does not degrade signal:noise ratio. But the sad truth is that the late President Kennedy did not promise the world a cure for record static and instead chose to back the space race with whatever money was necessary to win. So we now have a moon surface cluttered with derelict NASA hardware and a world full of gramophone records that collect more dust whenever they are cleaned. What can we do about it?

As already mentioned, static is no real problem in conditions of high humidity, because whatever charge is generated quickly leaks away to earth, mainly via surface moisture. Breathing lightly on a record every time it is cleaned is certainly a worthwhile habit to adopt, and easier than moving home to a jungle location where humidity is 100 per cent. One of the reasons why Japanese record pressings are so excellent is that they are produced under working conditions that no Western factory worker would tolerate, with humidity well up to jungle level and thus no problem of dust in and around the presses.

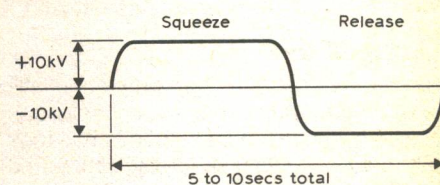
It is, however, well worth looking at the possibility of artificially humidifying your home to raise the moisture content of the air somewhat. Largely as the result of the spread of central heating, far too many

What it's all about

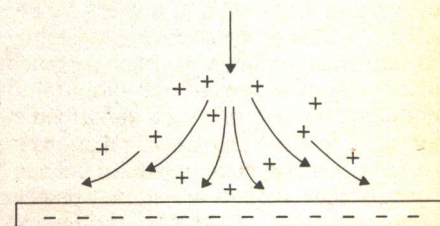
A piezo-electric impact or low voltage oscillator-generator device for producing sparks (eg. for gas ignition) produces many thousands of volts in a very short time . . .



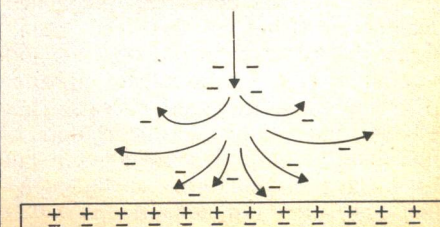
But the positive and negative ions produced at the region of the spark mix and neutralise each other, and thus cannot neutralise the charge on a disc. With the Zerostat the crystal is slowly squeezed and released to produce not a spark, but a stream of ions of one polarity and then a stream of the opposite polarity.



A negatively charged disc bathed in the positive ion stream has its charge neutralised . . .



The disc, now neutral, does not attract the following stream of negative ions and thus remains neutral.



homes are consistently at excessively low humidity (often well below 40 per cent) and quite apart from aggravating static this can have far-reaching detrimental effects on health and temperament as well as throwing pianos out of tune and furniture out of shape and causing cracks in the walls and ceiling. But before embarking on a home humidification programme, do check first that you really have a humidity problem, for instance by buying or borrowing a humidity meter and checking that your average level really is consistently well below the 40% to 60% comfort level. Also, don't waste money on pathetically inadequate humidifiers, for instance the type that hang on a radiator, hold only a pint or so of water and cannot possibly make any noticeable effect on overall humidity. If you have a humidity problem, and live in anything larger than a cupboard, you will need a power humidifier that force feeds something in the order of pints of water per hour back into the air.

Let's assume now that either you have a low humidity problem and are stuck with it or, more likely, find that static is still a noticeable problem even though your humidity levels are in the comfort region. After all, it is no consolation that a disc may lose its static charge over a matter of minutes in a fairly humid room, because before those minutes are up it will have had the chance to collect a damaging amount of dust.

The most obvious answer to the problem is never to let your records get dirty in the first place, so that they never need cleaning and thus never accumulate a static charge. Thus, do try wherever possible to keep records at all times in their sleeves so that they have the least possible chance of getting dirty. Also, if your gramophone has a lid which will close while records are played, close it. And if

Radioactive

But assuming all the problems still exist, what are the mechanical solutions available for dispersing static? Let's look at the odder ones first. Firstly, ozone and ultra-violet light as used in some air cleansing gadgets, will ionise the air, thereby making it a good leakage path for a static charge. But forget about ozone. It's a dangerous gas in anything above the smallest amounts and is a likely cancer risk. In any case it will gradually destroy almost any material with which it comes into contact, doubtless including gramophone records. Another method of ionising the air to provide a leakage is to use a radioactive source. Indeed radioactive antistatic gadgets are already used in industry and have been sold at domestic level for hi-fi use. But in August 1975 Harwell released a report (NRPB-R36) assessing 'the hazard to the public from antistatic brushes' containing radioactive material. Brushes of this type, some under the trade name Staticmaster and containing the radioactive material polonium, have been offered for sale; but the long and short of the Harwell report is that they are not only a potential health risk to the public but have a limited useful life and are unnecessary, because

equally efficient, safe alternatives are available. Thus there are very good reasons for *not* buying a radioactive antistatic gadget if the opportunity arises, for instance if you find one illegally on sale in the UK or in shops abroad where restrictions are slacker.

Fluid treatment

One of the safe alternatives to radioactive static elimination mentioned by Harwell is antistatic fluid, but hi-fi enthusiasts are naturally reluctant now to add any extraneous material to the surface of a disc, especially if tracking at the very low cartridge weights now common.

It would seem an obvious answer to rid a charged disc of static by mechanically leaking it off to earth. One approach to this over the years has been to place a conductive mat under the disc and conduct the charge away to the earthed spindle. On the whole this has been unsatisfactory, because the charge on the disc is on its upper surface, the conductive mat is in contact with the lower surface, and in between there are several millimetres of very high resistance plastic. Various gadgets have been proposed for trailing conductive fibres along the disc top surface as it plays, and on the Continent there is currently a fairly expensive gadget which trails copper wire over the disc surface. But I wince at this for the obvious reason that trailing anything metallic over a scratch-prone disc surface must be at best a questionable hi-fi practice. In any event recent tests have shown that simply trailing an earthed, conductive object over a charged surface does not necessarily leave it charge free.

An alternative and more hopeful approach is currently marketed by EMI Records (at (£2.99)). This is an antistatic mat from the Continent formed of carbon fibre material, which is intended to neutralise (rather than leak away) the charge of a record when in contact with an earthed centre spindle of the turntable. The idea is that as the charged record is placed on the mat, which is effectively earthed via the spindle, a charge opposite to that on the record comes up from earth to the mat and forms a sandwich which is overall neutral. In practice, the mat seems to work well, but with two problems. By producing an overall neutral sandwich of disc + mat, the charge on the disc is only temporarily 'hidden', as opposed to permanently neutralised or leaked off. Thus, as the record is picked up off the turntable again, it may well regain its charge when removed from the mat. Also, the mat may itself tend to collect dust from the air and from records placed on it. This collected dust is, of course, a potential risk to records subsequently placed on the mat. Also a purely mechanical point, I found warped or grooved records tended to slip more on the surface of the mat than on a conventional record turntable. Another of the non-radioactive safe methods of static dispersal examined by Harwell was the Zerostat, which is of course the Bangor brainchild.

The idea of an electrostatic pistol has been around for years, but it was the current upsurge of interest and availability of

ceramic crystals capable of producing very high voltage under manual pressure (as in spark gas lighters) that really made the Zerostat possible at relatively economic domestic level. Prof. Secker originally designed the pistol to create a charge for research work that he was carrying out. The idea was to produce a stream of charged particles, all of the same polarity, which could be shot at an object to *charge it up*, without the need to polish it. Then he saw the possibility of using the stream of charged particles to *eliminate* an existing charge by *neutralising* it. This is the crux of the idea behind the Zerostat — the aim is *not* to leak off the charge into the air, as through conductive damp air or air ionised by radioactivity, ultraviolet light or ozone, but to *cancel* it out permanently with an opposite charge.

The Zerostat became a commercial proposition after a local Welsh TV station broadcast an item on the gadget, and it was taken up by *Tomorrow's World*. A licence arrangement was entered into with the firm now called Zerostat of St Ives, Huntingdon, and the University College of North Wales who receives a small royalty for each Zerostat made and sold by Huntingdon.

A ceramic crystal is compressed by a roller cam mechanism to produce a high voltage (around 10 kV) that is fed to a needle point. Whereas in a gas spark lighter the crystal is hit hard by a spring loaded release to produce a single pulse, in the Zerostat it is slowly compressed by the roller cam as the trigger is squeezed. This charges up the needle with one polarity and causes the ejection of a stream of ions from its tip. As the roller cam moves back to its original position (when the user releases pressure on the trigger) the crystal returns to its previous shape and in so doing produces a charge of opposite polarity which causes a stream of oppositely charged ions to leave the needle tip.

A gramophone record normally builds up a negative charge when it is polished, so the stream of positive ions from the Zerostat will cause neutralisation. But the obvious questions are what happens if positive ions keep falling on the record after it has been neutralised, and why doesn't the stream of negative ions also emitted by the pistol charge up the record with an opposite charge after it has been neutralised by the positive ions? And why provide for two oppositely polarised streams of ions anyway, when a record will only have one charge? To answer the second question first, it is argued that although most records charge up negatively when cleaned, there is always the possibility that some materials will take up a positive charge, and thus streams of both polarity ions must be available. And although it is possible to 'over-neutralise' or recharge a neutralised record by excessive use of a Zerostat, (that was, after all, the intention behind Secker's original research work) this is not a ready occurrence, because once the record is neutralised it ceases to attract ions, just as a neutral, uncharged record ceases to collect dust.

By now there have been enough reviews and demonstrations, often using

electrostatic measuring devices, for it to be generally established that the Zerostat really does neutralise the charge on a record. Thus, if you have a static problem and can't cure it by breathing or with humidification, you may well wish to consider using a Zerostat to neutralise the charge created every time you clean a record. As the makers were last year gleefully ready to point out when I tried in vain there is no possibility of reproducing the neutralisation effect of the Zerostat using the much cheaper and superficially similar looking spark gas lighters now filling almost every hardware shop. This is because these impulse spark gadgets do not produce the necessary slow stream of single polarity ions. Likewise, high voltage spark generators fail for similar reasons.

A price to pay

I have consistently argued with the manufacturers that at 76.99 the Zerostat seems remarkably expensive, bearing in mind what little it comprises. The Zerostat argument in support of high cost, despite simple design, is partly that a royalty must be paid to Bangor, and partly that there are problems in securing sufficiently reliable ceramic crystals and mounts that will compress them by 0.001 of an inch up to 50,000 times without breaking or losing efficiency. The patent and supply situation is also somewhat confused. Prof. Secker's patent application for the Zerostat pistol is still pending, and the American

company Vernitron hold a string of patents on almost every conceivable ceramic crystal and pressure device, including the crucial roller cam. Although everyone concerned is reluctant to talk (Vernitron, for instance, will not discuss their patent position) it seems that Zerostat buy the crystal direct from Vernitron and have no option but to pay the going rate or do without. Whether this going rate, along with the royalty paid to Bangor, is so high as to justify, the high cost of the pistol is anybody's guess. But Bangor are at pains to point out that their royalty is "in no way disproportionately large". There was recently talk of competition for Zerostat, a pistol made by a rival British company at around two-thirds the price; but again, no one is talking about how it came to be abandoned before it ever went on the market. All in all, therefore, until a cheaper alternative to the Zerostat comes along, it seems a good buy, but only if you really do have a static problem. Otherwise it is just one more hi-fi toy.

What of the future? Obviously it could make sense to build an automatic Zerostat into a gramophone, so that neutralisation would occur without the need to fiddle around with pistols. The problem is that it is always possible to overkill by producing far too many ions for the charge to be neutralised, and in so doing create a charge; it is clearly very difficult to gauge automatically the amount of neutralising charge needed for each disc under each

circumstance. Passive neutralisation is a more hopeful possibility on which Prof. Secker is currently working. A needle connected to earth is simply suspended over the charged record as it rotates. If negatively charged the record tends to pull out positive ions from the needle which are replaced by its earth connection, thereby causing overall neutralisation. And of course this would be an ideal solution — no power, no effort, no risk of creating a charge and purely automatic operation. It works but so far it just doesn't work well enough. Other possibilities are automatic humidification in the area of a record turntable. But the problem here again is overkill, with the risk of making the disc surface far too wet, because all that is needed for charge leakage is a layer of molecule or so thick. And this, of course, brings us back to that age-old trick of simply breathing on a surface to deposit a molecular layer of moisture.

Although Prof. Secker clearly has a commercial interest in seeing the Zerostat continue to sell, he admits that the only real answer to static on records is the production of an anti-static record. But as my researches have showed, none of the companies is yet anywhere near success in this field. Perhaps what we need is a Prime Minister who as an election issue will pledge an end to static and make available 'enough hard cash for the necessary research.' I'd vote for him at least.

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TEST BENCH-JVC JR

By Philip Mount

Of five new receivers from JVC, their JR-S200L tested here assumes a position one step up from a more budget conscious brother. At approximately 35W output per channel it still isn't small however, and nor are its physical dimensions (no, forget her physical dimensions and just look at the receiver on the front cover). The model does nevertheless reflect a few trends in Japan's active hi-fi market, although they are ones we get to see a year or two after currency in that country.

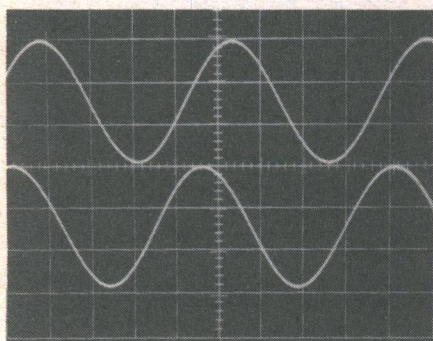


Fig.1. Full output was delivered into a simulated dynamic speaker load as shown here. The upper trace is applied voltage and below it current at 60° phase lag.

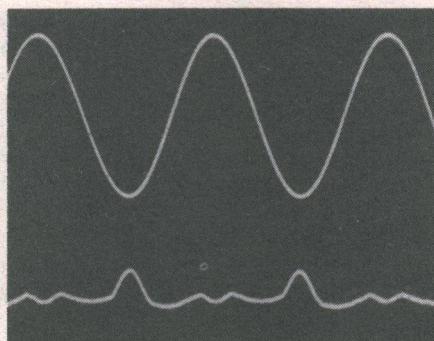


Fig.2. Distortion increased slowly with rising level and measured 0.1% at full output into 4ohms, shown here.

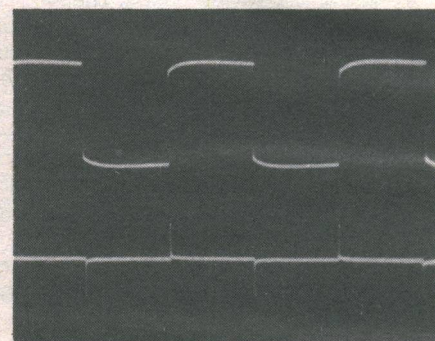


Fig.3. Square wave response through the disc input was very good, but characterised by a degree of treble roll-off (upper trace). Lower trace shows quiescent channel residual.



The JR-5200L under test. To appreciate its appearance more fully, take another look at the front cover

-S200L RECEIVER

One concerns styling where a functional quasi-professional appearance has become popular. This usually takes the form of products being fitted with banks of sliders, fine calibrations on the controls and rack mounting flanges fitted to cabinet ends. The JR-S200L features all of these, its SEA graphic tone control system adding a notable air of complexity to the busy looking front panel. Also popular in Japan of late have been valve amplifiers, preferred by many for their sound quality rather than measureable performance attributes. Although it is not possible to make transistor amps mimic their valve counterparts at present this has focused attention on, for want of a better word, 'the transistor sound'. JVC's new range of amps/receivers seem to bear a particular sound quality that, I would guess, has been affected by this move away from the less pleasant subjective effects of reproduction through a typical transistor amplifier. Other Japanese manufacturers are also aware of the problem, it would seem, from veiled allusions made in their advertising and press releases.

There's no doubt that the JR-S200L is good looking within its own particular context of styling and most people seem reasonably impressed with the strong technical appearance, underlined by fairly large size and two prominent meters that illuminate the blue when the set is switched on.

The radio section features both VHF FM with automatic stereo and medium and long wave too, the latter being an uncommon addition for Britain but apparently popular in the rest of Europe. Above the clearly calibrated and angled tuning scale are those two meters, one for signal strength and the second for tuning accuracy of FM. The former is operative on all wavebands and in JVC's own words — 'When it makes biggest deflection you are correctly tuned'. The tuning accuracy meter gives a clear indication of tune point on FM, necessary to ensure least noise, distortion and best channel separation. Between the two meters a blue legend illuminates upon receipt of a stereo signal.

Beneath the large open tuning scale lie a row of black push buttons that control many functions incorporated in this receiver. Two pairs of speakers may be connected and selection of either or both pairs made by pressing associated buttons in this row marked 'speakers 1 and 2'. With both buttons out all speakers are muted, a useful condition for headphone listening without causing disturbance to others. Along from these buttons are a further five that control 'selection' programme from disc, aux or the tuner and then a further three cover tape monitor, FM muting/mono and loudness functions. There is not one ordinary round control knob to be seen on the JRS receivers — JVC have even avoided using one mounted in the usual fashion for tuning purposes. Instead they have fitted an edgewise tuning control as they are usually called and although bearing a smooth surface this was easy to use. A large black panel is situated on the right hand side of this receiver and carries no less than seven finely calibrated sliders. Two are arranged horizontally at the top and cover both volume and balance between speakers. Beneath these are five small sliders of the graphic equaliser which is in effect a multiple tone control system. Each slider will increase or decrease output from the receiver over just one small part of the audio frequency band and this allows very fine selective control of programme character.

For instance, the left hand slider is marked 40Hz and controls level of deep bass signals only. Moving it upward to increase output at and immediately

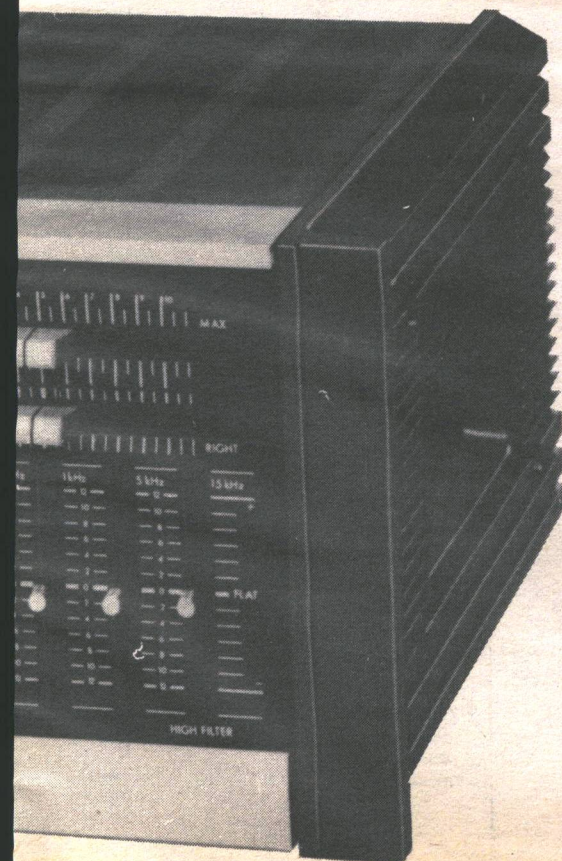
around 40Hz causes drums, plucked bass, electric bass etc to come forward and sound more prominent without affecting other instruments. The mid-band control marked 1kHz will affect vocals whilst one at 15kHz adds some details and can bring forward well recorded cymbals if adjusted upward just a little. The uses of such a graphic equaliser are many, one of the most commonly quoted being equalisation of a room's acoustic characteristics. I generally find such systems are most useful in the compensation they can provide at spectrum extremes (ie 40Hz and 15kHz) to combat response trends in loudspeakers and cartridges. Generally, just a small amount of boost or cut is needed, and in this a graphic equaliser is to be preferred to the cruder action of bass and treble controls. Other effects can be controlled too. If you suddenly decide after hearing some other hi-fi system that your own doesn't possess enough detail or sounds dull, then pushing the 6kHz control up by a small amount will help. Conversely, if the sound is too brash and forward, pushing this control down a bit should go some way toward easing the problem.

The rear panel of this receiver displays a fairly common assortment of phono socket inputs, whilst speakers are connected by screw terminals. A DIN tape record/playback socket is also provided, plus a co-axial FM serial socket in addition to the usual screw terminals for aerial connection. A ferrite aerial for long and medium wave reception folds out on a hinge from the rear and FM reception of strong local broadcasts can be achieved using an optional connection to the mains lead. As JVC rightly say, you would usually be better off with a proper aerial though.

Construction of the JR-S200L is very solid with finish up to the usual high standards of Japanese quality audio products. The front panel is of brushed aluminium which differentiates between various areas of black. When switched on, the illuminated blue tuning meters and tuning dial cursor stand out well and add some contrast to this frontal appearance.

Performance

Output from JVC's receiver is in the order of 40watts per channel and price is set at just over £200 so it obviously falls into a popular part of the market. Connection to the mains is through a stout three core cable and note that for safety reasons there are no mains outlets of the two pin variety provided. Both short term and long term protection circuits are fitted to guard



TEST BENCH-JVC JR-S200L RECEIVER

against failure of the output transistors but care has been taken in their design to ensure they don't inhibit output into difficult loudspeaker loads.

Although JVC rate the JR-S200L at 35watts per channel into 8ohms it goes into overload gradually above this level and will deliver up to 45watts on one channel in the mid-band before serious overload (clipping). The unit is quite happy working into 4ohms, with commensurate extra power output of 55watts before serious overload. These power levels are maintained up to 8kHz after which maximum power output starts to fall off by a slight degree, but this isn't serious. Performance into a typical dynamic loudspeaker load of the sort that upsets some amps are shown in Fig. 1. At a voltage-current phase angle of 60° the receiver would deliver its full output as shown into 8ohms impedance without breakup of the signal.

Distortion across the band into various loads was low although I noted some rise at high and low frequencies, plus progressive non-linearity with level. At low outputs distortion was minimal but increased slowly with level with both second and third harmonics being generated but no detectable crossover components. Full output into 4ohms at 1kHz is shown in Fig. 2 together with distortion in the lower trace which measured 0.1% and shows the production of harmonics on peaks in the output stage. Frequency response through the main amp was wide, stretching from 18Hz to 50kHz and this indicates that no attempt has been made to achieve an early roll-off for minimisation of some distortions.

The disc pre-amp behaved very well in all respects. It maintains symmetry on high level signals to a degree still not often met, the square wave of Fig3 displaying this aspect well. Slight rounding of leading edges in this trace was due to a slow high frequency roll-off that caused response to be -0.5dB at 10kHz and -1dB at 20kHz. Beneath the upper trace, output from the second channel is shown (amplified) and little breakthrough is present bar some spikes from high frequency effects. Overload margins were maintained right across the frequency band and never sunk below +36dB, a high figure. Little extra distortion was generated by the disc pre-amplifier at typical working levels and right across the frequency band. There's no doubt that JVC have paid a lot of attention to this part of the receiver's circuitry and at least in all measureable aspects performance of their disc pre-amp is exemplary.

Like the rest of this receiver, performance of the FM radio section was in general very good. Frequency response of the tuner could have been more carefully engineered from 50Hz to 14kHz. A sharp filter to eliminate the pilot tone at

19kHz exhibits an in-band throw up of +1.6dB at 12kHz and this could at times be detected during some critical A-B music tests where percussion showed slight emphasis at times. Distortion on stereo programme measured averagely but noise was quite well suppressed at full limiting on a strong signal. The 50dB IHF figure for limiting level is a good practical indicator of the sort of aerial signal strength needed for reasonably noise free stereo reception and in this respect the JR-S200L manages averagely in requiring 80µV for such a performance, whereas equivalents on the market can usually do better.

Separation between channels was well maintained at low, medium and high frequencies and this ensured good stereo imagery. Ability to deal with closely spaced stations (selectivity) was extremely good at greater than 60dB and this allowed the unit to give interference-free reception under difficult circumstances where stations are closely situated to each other.

Sound quality from the amplifier was pleasant and as you may have gathered from earlier comments, free from sharp unnatural top end effects that can become increasingly annoying once identified. Bass quality was good, if only as good as all other competitors, and without that rarely found lucid impact that one or two, notably American amps, possess. Over a period I found the receiver very easy to listen to and it definitely errs toward a softer easier sound quality than that normally experienced. Some loss of definition or clarity was heard against a particularly fine reference amplifier but this is in part due to that slight roll-off in response of the disc stage. Although I found the softening of quality slightly annoying at times it is probably preferable to a hard steely top end and is a character trait that most people would on balance find easier to live with. On the whole, this receiver from JVC is well engineered and gives good all-round results plus fatigue-free sound quality even if it is a shade lacking in definition.

2700 Test Results

Parameter	Manufacturer's spec.	Test result
Power output	43W into 4ohms, 0.5%thd	42W into 4ohms, 0.16%thd max. 60Hz — 20kHz
	38W into 8ohms, 0.5%thd	35W into 8ohms, 0.15%thd max. 60Hz — 20Hz
Frequency response	(both channels driven) not quoted	(one channel driven) 18Hz — 50kHz ±1dB, aux. 20Hz — 20kHz ±1dB disc. 8ohms 4ohms
Distortion	intermodulation — 0.5% at rated output	20kHz 0.15% 0.16% 1kHz 0.075% 0.1% 60Hz 0.07% 0.14% at above outputs, aux input. 19kHz & 20kHz = 0.025% 1kHz & 1.5kHz = 0.025% intermod., full output, disc input -71.5dB -84.5dB (DIN 45405 wtd)
Signal-to-noise ratio	phono — 63dB aux/tape — 84dB (unwtd)	51 at 40Hz ref. 8ohms 2mV for 35W, +36dB overload 20Hz — 20kHz 140mV for 35W.
Damping factor	50 at 8ohms	
Input sensitivities	phono 2.5mV/50kΩ aux 150mV/60kΩ	
TUNER SECTION		
Tuning range	87.5 — 108MHz	Yes, scale calibrations accurate
Usable sensitivity	1µV/75ohms, 1.9µV/300ohms	1.25µV/75ohms
Alternate channel selectivity	60dB	78dB
Stereo separation	35dB at 100Hz 45dB at 1kHz 35dB at 10kHz	36dB 50dB 32dB
Distortion	0.2% mono 0.4% stereo (±40kHz dev. at 1kHz)	0.5% stereo, 100% mod at 1kHz
Signal-to-noise ratio		-66dB (wtd)
Frequency response		35Hz — 14kHz, ±2dB
Medium wave sensitivity	525 — 160kHz 50µV	yes
Long wave sensitivity	150 — 350kHz 100µV	not tested
Dimensions	6½in. high, 20in. wide and 13in. deep. 21-61lb weight	yes not tested

ADC ACCUTRAC AUTOMATED RECORD DECK



By Philip Mount

As if hi-fi equipment wasn't becoming complex enough, ADC announced some months ago the introduction of a 'computerised' turntable named the Accutrac 4000. Fidgeting, agog and in some cases, cynical journalists were told that this wondrous device cost no less than £100,000 to develop. This left my senses feeling more numb than usual. After all just what can a turntable do that makes its development cost the same as a lifetime's visits to the local? Change the records automatically? Make a cup of tea whilst you're listening? Tell the cat to do it somewhere else? Matters became clearer when the suave looking gentleman from BSR (they own ADC — I think that's the right way of putting it) giving an introductory lecture started waving a black box

around in his hand, one covered in small white buttons. Nearby an aluminium canister sat pregnantly waiting, a single eye set at the front suggesting some curious purpose. 'Good grief' I thought, 'it's like a 1950's science fiction movie'. But when the speaker started waving the box around and pressing buttons a red light blinked beneath the canister's eye and moments later their deck began to trundle into action.

So this was it. A remote controlled record deck. But that wasn't quite all of the story however for the deck possessed a track sniffing system so it would not just start, stop and sing the American National Anthem, but choose the very track you wanted to listen to as well. Not only that, but it could choose up to 13 tracks and play them in any desired sequence, obviously being of

great use in China where records are played backwards.

The 'computer' is in fact a logic system with memory. It will store instructions given to it on desired operating sequence and systematically carry them out automatically. The turntable system itself employs the now obligatory direct drive motor system for quality decks, but you may muse on the fact that ADC's hundred-grand didn't stretch to development of such a motor. They use one from Japan. Coupled with this is an independent pickup arm powered during auto-functions by a servo motor. The two sit on a conventional plinth system fronted by a rank of white push buttons and most control functions are duplicated on the remote control unit. Both this unit and a receiver as ADC call their curious aluminium canister, are provided with the Accutrac 4000.

Since the track sensing system is incorporated in the cartridge of this deck, it has to come supplied with a cartridge and changing this would remove one of the units most notable assets, although it can be done. However, as far as most people are concerned it can be said that the Accutrac really only accepts the cartridge with which it is supplied. You like it or lump it.

A closer look

All three units, the deck, receiver and remote control transmitter come packed in one box. Setting up follows conventions in most respects requiring the removal of transit screws to allow the entire deck and arm assembly to float freely on a sprung platform for shock isolation. A large die-cast platter possesses machined strobe marks around its periphery which are illuminated from an angled prism standing to the left of the platter for stroboscopic indication of speed accuracy.

Over on the right of the floating platform sits ADC's arm, a conventional affair of S-shaped (or swan neck as it is sometimes called) geometry moving in both planes on ball-race pivots. The

headshell is not removeable but slots allow tracking error adjustment of the fitted cartridge and its fixing centres are on 1/2in spacing as usual. Tracking force is applied through the now very common and convenient system of a calibrated counterweight, but with one slight difference. Since cartridge weight is fixed at that of the model supplied, ADC pre-set their counterweight force scale at the factory and provide instructions on how to push this weight directly onto the arm so that balance is achieved automatically on setting to zero of the force scale.

Should the factory pre-setting operation be inaccurate 'cos Mavis at the factory had quite a night last night, you can right matters with a screwdriver and some patience. Once the arm is in balance, ADC suggest that 1gm tracking force is applied for their cartridge but in a usefully informative note recommend that this be increased to any value up to 1.5gm should mistracking occur in practice. Bias compensation is applied to the arm through a small calibrated dial set on a platform attached to the arm pillar. Since this arm should only see use with only the cartridge fitted during its life matters such as arm height and cue height are not adjustable.

The cartridge on this deck is for the most part quite conventional, being a derivative of the ADC XLM with a light transmitter and receiver added to the front. It doesn't take the form of anything so cumbersome as a torch though, nor does it illuminate dust on the record in the dark. An infra-red miniature light emitter is housed next to

a receiver (probably a light emitting diode and phototransistor) this latter device sending back a signal to control circuits on receiving reflected light from the lands or shiny areas between tracks on a disc. At the original press conference many pairs of eyes rolled skyward on hearing that a whole transmitter/receiver system had been attached to the cartridge of this deck. It runs contrary to current thought on low tone arm mass etc, but whilst I feel certain some gentleman sheepishly quoted a figure of 10gm when asked about cartridge mass at the unveiling, the LMA-1 as it is called weighs precisely 8gm. Significance of its weight will be considered later. A tinted acrylic cover protects the arm and platter from dust and it moves on friction hinges. All controls remain exposed on a black panel in front of this cover so that they may conveniently be operated and there certainly are a lot to play with.

At left four spun aluminium knobs control mains power, sensitivity of the track sensor and speed accuracy at 33 and 45rpm on the two speed motor. Then come speed select (33 & 45rpm) and record size selection (7in. and 12in. or for singles and LPs) buttons in a group. Beyond these five buttons designated 'control' are grouped together and then comes a line, a veritable bank of 13 buttons for track choice. Both the control and track choice buttons are repeated in their

Test results

Pickup arm	
effective mass	16gm
inertia	$9.2 \times 10^3 \text{gm.cm}^2$
friction	
vert	10mgm av.
lat	20mgm av.
tracking force accuracy	accurate with care
Cartridge	
frequency response	5Hz-16kHz $\pm 3\text{dB}$ (STR 170)
separation	-30dB at 1kHz (TTR109)
output	3.5mV
stylus	0.0003 \times 0.0007 elliptical
tracking force range	0.75-1.5gm
weight	8gm
Turntable	
rumble	-41dB unwtd -63dB wtd B S4852, add 3dB for DIN 45539
silent grooves	acetate
speed variations	
wow and flutter	0.12% DIN wtd quasi-peak
wow	0.14% unwtd qu. pk.
flutter	0.05% unwtd qu. pk.
drift	0.2% pk-pk
long term speed stability	perfect, no change
speed v supply	
voltage	maintained from 240V to 180V AC
disc	DIN 45545, measurement to BS 4847 and DIN 45507

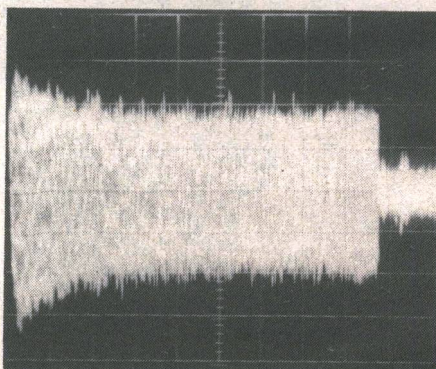


Fig. 1 - A low frequency response sweep from 5Hz to 20Hz, shown here, revealed that tone arm resonance with cartridge compliance lay below 5Hz.

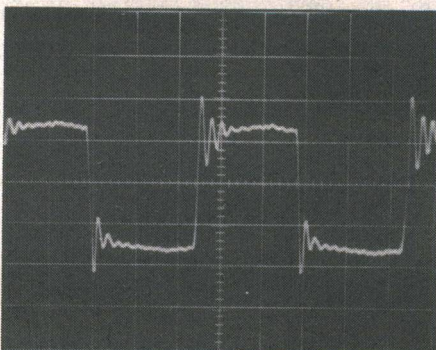


Fig. 2 - Square wave performance of the LMA-1 cartridge was good, indicating a well maintained frequency response, but ringing suggests light cantilever damping. Sweep - 0.2ms/div. Ring frequency - 21.5kHz

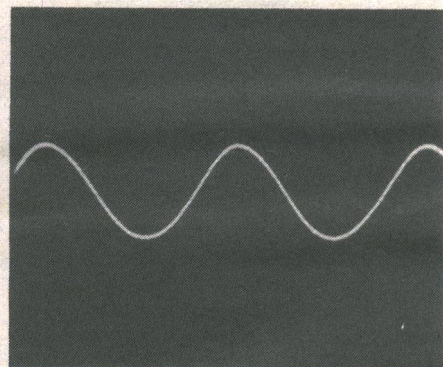


Fig. 3 - This shows distortion caused by vertical tracking angle error due to the stylus being mounted at an incorrect angle. Note the assymmetric appearance of the sine wave with sharp top peaks and rounded troughs. Distortion measured 8% but a well engineered cartridge can turn in figures of 2 1/2% on this track.

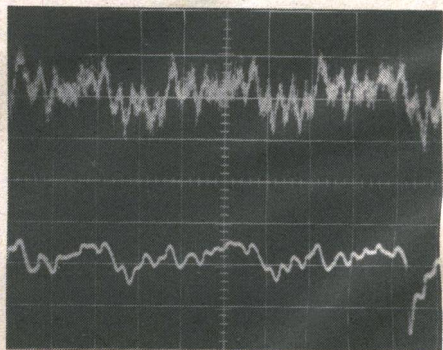


Fig. 4 - Speed variations can be seen in total on the upper trace (wow, flutter and drift) while just wow filtered out from the upper trace is shown below (wow is most annoying). Variations existed in a sensitive region of the ear, but were due to a faulty motor. Sweep - 0.5 secs/div.

entirety on the remote control box, but not speed change, disc size etc as these can be easily set when selecting the disc to be played.

Like a computer the Accutrac has to be programmed and will store up to twenty four commands in its memory. Happily, ADC have given owners the option of manual use as well as fully automatic. Just getting the Accutrac to do what you want takes some getting used to, but once the command sequences have been mentally imbibed the system should present few difficulties to most owners. The simplest and probably most used command will probably be the one necessary for fully automatic play of an LP from start to finish. This is issued by pressing a control button marked 'play' which starts the platter, but otherwise there's a deathly silence. You know the computer is waiting for its next command. What a responsibility! Worse than feeding the cat. Tucked away at the end of those thirteen track select buttons is one marked 'all', so in logical word sequence this is pressed to initiate a complete command of 'play all'. Being well versed in truncated English, the computer understands this and the turntable will play an LP through in its entirety, returning the arm to rest and switching off at the end.

One command that fooled me for a short time was that entitled 'reject'. The Accutrac understands this as 'reject the track being played', not reject the entire LP as usual on auto decks. In this sequence the arm returns to its rest, then comes out again to the next track on. To reject an LP completely, a button marked 'clear' must be pressed (if you can follow all this I'm surprised; it's beginning to confuse me already).

To play selected tracks, the 'play' button is first pressed and then the appropriate track buttons in any desired sequence. Or you may press the track buttons first and then the play button. If adjacent tracks are wanted, say numbers two and three, but not the first and last tracks (one and four) of a four-track LP, the deck will just play these with continuity and then switch off. If how-

ever you should want tracks two and four on the same LP, first number two will be played and then the arm returns to its rest and comes out again to begin a fresh count in order to find number four. In reject mode it again returns to rest before returning to find the next programmed track or the next track on if 'all' have been selected. Are you still there? There are another two functions to describe yet.

A full description of what you can repeat and how you programme the deck to do it could fill a book. Let it be said that tracks, or a whole LP can be repeated in any sequence any number of times until you go mad listening to it. Whether you could ever summon up enough patience and application to study and programme the deck correctly in the first place is another matter. But cowards of technology can take heart. ADC have provided a manual option that will circumnavigate this programming lark. Start the turntable (it's like being a learner driver) with the 'play' button, cue the arm over the record and then press 'cue'. The arm will lower play the record through and return to its rest at the end, switching off the turntable too. For hand cueing, or real manual use as one might term it, the play and cue buttons are pressed and this leaves the arm to be lowered by hand onto a disc. The cue button may be pressed at any time to interrupt play, and then pressed again to start it.

Shut-off at the end of a disc is through electronic detection, as it needs to be with very high compliance displayed by the cartridge. In use the Accutrac performs its operations both smoothly and quietly and I rarely experienced any trouble with the system in use. Once or twice it chose the wrong track and there are LP's which don't possess discrete bands to allow track selection to be used, but for most of the time I found the system singularly successful. Whether one wants to use it is another matter. I rarely used a fraction of the Accutrac's total logic ability and after initial interest has waned complex button pressing sequences

become something of a chore, although for ordinary use this deck is more difficult to operate than others.

Remote control

Remote control of the Accutrac is achieved by an ultra-sonic transmitted/receiver arrangement. The receiver has to be on line-of-sight with the hand held transmitter so it is provided with a long cable to allow freedom of placement and the cable plugs into the rear of the turntable plinth. ADC describe this advice as a 'sleek, sculptured remote receiver'. It was rapidly dubbed 'the metallic mushroom' in this quarter and in general styling was felt to be juvenile in concept. It will be out-of-context in most domestic surroundings although at 4½in. high the unit is not obtrusive through size. A can of spray paint would help this device to blend in with its surroundings, but the microphone it houses would have to be masked off first. A small red LED indicator is situated beneath the microphone and flashes in recognition of a command issued to it by the transmitter. The transmitter is aimed at the receiver from anything up to 50ft away and commands issued by pressing the buttons. The red receiver light should flash to acknowledge each command but in practice if your aim isn't too good, possibly due to immediate circumstances (?), you are likely to miss. It's best to 'spray' the target area with the transmitter, crude perhaps, but very effective. In size and weight the transmitter can be said to fit the hand quite well. It is battery powered and remains on only for the short period during which a command is issued, so battery life should be long.

How well it works

Current recommended retail price of the Accutrac 4000 is £287.10 but it is sold at discount and I can find one retailer offering it at £265. For this appearance and standard of finish can only be described as average. I personally find the front panel to be a crude and inharmonious blend of black, white and brightwork. Constructional quality is good — the unit feels solid and works quietly but otherwise the model is a visual non-entity. Even the acrylic cover is average, being identical in quality and the hinges used as those found on the meanest of budget decks. I suspect however, when looking at something like the cover that ADC have had a battle to keep retail price down to what they felt to be a reasonably acceptable level, probably set at a maximum of just under £300.

The arm moves very freely on its pivots in both planes but mass (effective mass) is a typical magnitude for such a conventional design of 16gm. With cartridge weights currently averaging 6gm (but they should be lower) the ADC LMA-1 is 33% heavier than average at 8gm and this sets total mass of the system at 16+8 or 24gm which is high. It is unfortunate that the LMA-1



Rumble spectrum — this shows distribution of rumble components with frequency, peaks showing dominant tones. Those above 80Hz can become very annoying through the ear's greater sensitivity to high frequencies. Also the 4000 cartridge response.

Listen to the Professionals

The new JRS series of high fidelity AM/FM stereo receivers gives you the choice of 5 powers from 2x22W RMS to 2x120W RMS. Angled dial plates and "human-engineered" control layout means ease of operation and each receiver has advanced tuning circuitry, new and stronger power sections, trend-setting styling and a host of other outstanding features like the S.E.A. Graphic Equalizer to permit sensitive adjustments in five distinct frequency segments, dual-flywheel tuning mechanism, and FM noise

reduction with ANRS. The JR-S200L (illustrated) is a 35W RMS x 2 Stereo FM/AM/LW receiver with tuning and signal meters, super long and linear dial scale and two-deck recording/dubbing facility.

A complementary range of cassette decks, speakers and turntables includes the JL-A15 Semi-Automatic Belt-Drive Turntable (illustrated) with Trace Hold Tone Arm, automatic return and shut-off and up-to-the-minute styling, and the CD S200 Vertical Open-view Cassette Deck (also illustrated). This handsome front-loader incorporates a number of advanced features including ANRS automatic noise reduction system, timer recording facility, Sen-alloy head for longer life and better response and LED (light emitting diode) multi-point peak level indicators and full all-mode automatic stop mechanism.



JVC (U.K.) Ltd., Eldonwall Trading Estate, Staples Corner,
6-8 Priestley Way, London NW2 7AF. Tel: 01-450 2621.

JVC
ANOTHER STEP CLOSER TO REALITY

ADC ACCUTRAC AUTOMATED RECORD DECK

cartridge is very compliant yielding a poor match between the two units. ADC as a company consistently ignore the arm mass/cartridge compliance relationship and its effect in practice, and they have done so again on the Accutrac. Tone arm resonance lay below 5Hz, a sweep between 5Hz and 10Hz of its response being shown in Fig. 1. As you can see from this, output is falling from 5Hz and is flat right up to 20Hz. Since at resonance output is generally doubled (+6dB) unless pivot damping is high, which it isn't on this cartridge, resonance obviously lies well below 5Hz because the trace is so flat. What this means in practice is that the arm will not ride over warps of 4Hz approximately or greater, but the cartridge will trace them. Since total warm excursions (amplitude) are large relative to designed movement of a stylus cantilever this is going to cause some gross stylus movements, and it did in practice. If the cantilever is forced into a non-linear region of mechanical operation distortion will also result, and in any case the cartridge will (and did) feed any subsequent amplifying system with high level and totally spurious warp signals. This necessitates the use of a particularly effective warp or 'rumble' filter as they are sometimes called, on an amplifier to prevent sub-sonic amplifier overload and violent loudspeaker cone movements. As a combination the arm and cartridge are very poorly matched to each other.

The LMA-1 tracks very well at low frequencies and high frequencies too, yielding an unusually clean waveform from test signals between 10kHz and 20kHz. This performance was confirmed in practice by the cartridge's ability to provide confident reproduction from the most difficult of discs and towards the end of disc sides where distortion often seems to be an inherent part of the groove until a Shure cartridge or the LMA-1 shows that this isn't the case.

Frequency response was essentially flat across the audio band with no sign of a mid-range dip but a pronounced rise to tip mass resonance is apparent above 10kHz which suggests light cantilever hinge damping. Square wave response shown in Fig. 2 confirms this by the appearance of mechanical ringing, but well maintained waveshape also underlines the flat frequency response characteristic. Ring frequency lies at 21.5kHz, a high figure which suggests low effective tip mass and this confirms the good high frequency tracking performance. An unfortunate feature of a few ADC cartridges I have tested to date has been their vertical tracking angle error, revealed by high second harmonic distortion on vertical modulation. The oscillogram, Fig. 3 shows this

in classic form — an assymmetric sine wave with sharp and rounded peaks. Distortion on this signal measured 8% second harmonic and the disc used (CBS STR112) was cut carefully to possess a vertical modulation slant of 15° after lacquer springback. Since Neumann of Germany who manufacture cutting lathes now heavily angle their cutting styli to give a nominal slant of 20° to agree with European standards of 20° ±5°, and Ortofon are cognizant of the problem too, the ADC cartridge will certainly generate unnecessary distortion on music discs (as opposed to test discs). Measurement with another disc, DIN 45542, showed that the stylus of this cartridge is set at far too great an angle, over 30° in fact. Visual inspection confirmed this. Unfortunately, I have to say that this error is gross compared with that of a majority of other cartridges, most of which manage distortion figures on the CBS test disc of much less than 8%.

Sound quality of the LMA-1 was on the whole good with flat overall subjective tonal character bar a sting at the top end which made its presence noticeable on sibilance and altered the character of metallic percussion instruments. Disc surface noise also sounded rather thin and sharp. That rise in high frequency output is responsible for many of these effects and shunting the cartridge with high capacitance helped. Generally, the LMA-1 is fairly clear, uncoloured and displays good bass quality and on the whole can be rated quite highly in terms of subjective quality and overall ability, with the exception of conflict between high body weight and high compliance.

Turntable performance

I am told that ADC have used a direct drive motor from Matsushita Electric of Japan, a company that markets the National Panasonic and Technics brands. Garrard openly admit that they have also used this motor on their new DD75. Comparing the two shows that their motors are identical.

What's the relevance of all this? Quite simply the Accutrac 4000 reviewed for this report rumbled like an express train, if you'll pardon the expression. Subjectively, rumble level was very high and extremely annoying, primarily due to components at 100Hz, 150Hz and 300Hz. But this was definitely a fault and I say this because having recently reviewed a DD75 matters were not so bad. However, the DD75 rumbled at a level equivalent to that of current belt drive decks selling for around £60 from Japan (not all belt drive decks rumble, but most Japanese ones do — at 100Hz). The noise exists in fact as a drone rather than a deep

bass rumble. On the DD75 it was at a very low level and should rarely be noticeable so one can expect a similar performance from the Accutrac 4000 since it uses the same motor.

There are two points that should be noted however. First is that direct drive in itself guarantees nothing in the way of performance. It's the quality with which it is engineered that determines performance and the Matsushita motor looks from the two samples I have tested to be average and variable in its abilities. Belt drive decks from Fons, Linn and Ariston make the DD75 and Accutrac 4000 look a bit silly in terms of rumble. Also, retail price must be considered too when judging ability and here lies the main difference between Garrard's DD75 and ADC's Accutrac 4000. It is this difference that leads me to draw what might appear to be different conclusions about them, for the Accutrac costs over three times that asked for the DD75.

Rumble figures for the Accutrac look reasonable, but the weighted figure is worse than normal and reflects a peak at 300Hz in the rumble spectrum graph. Rumble spectrum clearly shows the peaky nature of the off-disc (an acetate) signal caused by many disturbance tones being present.

Because the motor was in trouble, speed variations were higher than they should have been, although still at a reasonable absolute level. The oscillogram, Fig. 4, shows wow existing at 6Hz or at a frequency where the ear is most sensitive to frequency modulation effects of this nature. This also leads to a high weighted wow and flutter figure being recorded, equivalent in level to that of wow alone. Since Garrard's DD75 behaved impeccably on these tests, it must be said that the Accutrac 4000 should do so in practice too. Absolute speed could be set to a high degree of accuracy with the stroboscope on this deck, within ±0.1% and it did not drift over a period of two hours. Speed performance is maintained in every sense with this motor as supply voltage falls until it reached 180V ac, but the mains supply should not in practice drop to this level.

How you view the Accutrac 4000 depends upon your disposition. Those interested in attaining the highest fidelity currently possible by today's standards could achieve it at much less expense with conventional alternatives. Inability to make a choice of cartridge is fundamental to some of the limitations of this model. For those who seriously believe they have an enduring use for automatic track selection and remote control, this deck should provide them with high quality and a generally competent mechanical performance, in the widest sense.

Introducing the MAXIMA, OPTIMA & SUPERFERRITE a new concept in cassettes from PYRAL

Super Optima ★★



SUPER OUTPUT

Super Optima, utilising new generation Microferric technology, is designed to give Super Dynamic Range, without the sacrifice of low frequency output.

This means high output without excessive signal distortion.

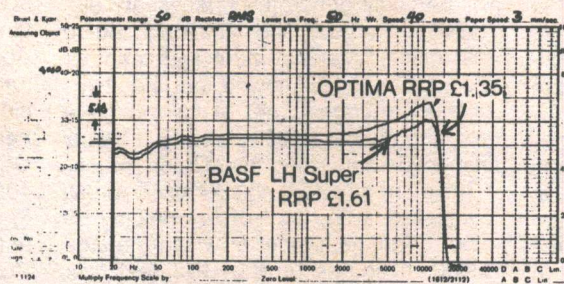
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Pyral cassettes, utilising the exclusive P.U.A. oxide dispersion process, also offer the recordist true low noise performance, based on extensive research by Pyral in the development of Low Noise studio recording tape. T.V. and Recording experts throughout the world rely on Pyral - so can you.

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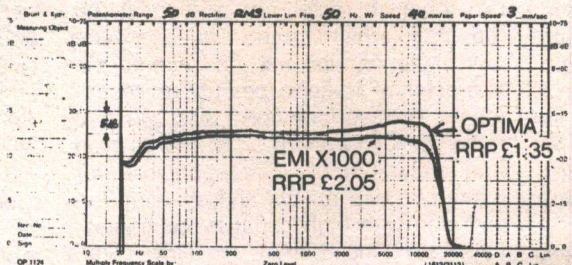
For superior wow and flutter, in cassette tape winding and "trouble free" life Super Optima features the new "cushion foil." Rejecting the principle of internal cassette gadgetry, Pyral opted for the "folded foil" concept gently guiding the tape into a smooth pack within the cassette.

We took 3 leading Super Quality Cassettes available to the Hi-Fi public to use as reference to compare the frequency response characteristics of Pyral Super Optima.



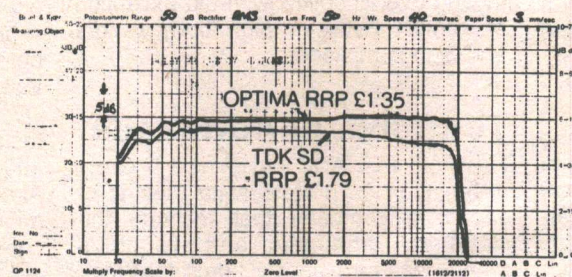
Optima referenced to BASF LH Super
standard ferric bias

Table 1



Optima referenced to EMI X1000
standard ferric bias

Table 2



Optima referenced to TDK SD
biased for TDK SD

Table 3

All RRP are at time of going to publication and exclude VAT
All cassettes tested were C90

TEST PROCEDURE

Three cassette decks were used to give a better spread of tests on machines available to the Hi-Fi enthusiast. In the case of Graph 1 the Toshiba PC 4030 deck was used, Graph 2 the AKAI GXC 310D, Graph 3 the Nakamichi 700.

The input level was -20dB ref Dolby level. Test equipment was based on B & K 2010 Analyser and B & K 2307 level recorder.

The bias setting was as shown on the graphs.

Whereas Pyral are conscious that frequency response characteristics do not completely define the performance of a cassette, the graphs serve to illustrate the performance of the new Pyral Super Optima cassette on three quality cassette decks. However, there are many quality cassette decks with differing bias and equalisation characteristics, so fill in the slip below and confirm for yourself that with

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LISTENING IS BELIEVING

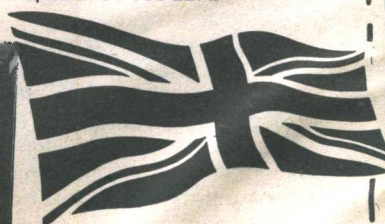
(a) I want to hear more about Pyral's new cassette range and star ratings. Please send me details by return of post.

(b) Please find enclosed cheque/postal order for 70p for my sample of Super Optima C90.

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Telephone: 01-681 2272



Pyral Magnetics Ltd. reserve the right to modify and/or adapt all products in their pursuit of its policy in implementing improvements resulting from research and experience

HFPI2

TDK Super Avilyn. Hearing about it is one thing. Hearing it is something else.



If high fidelity cassette tapes form an essential part of your recording equipment, you must by now have heard about Super Avilyn – the tape that outperforms chrome and has none of its drawbacks. But have you *heard* it?

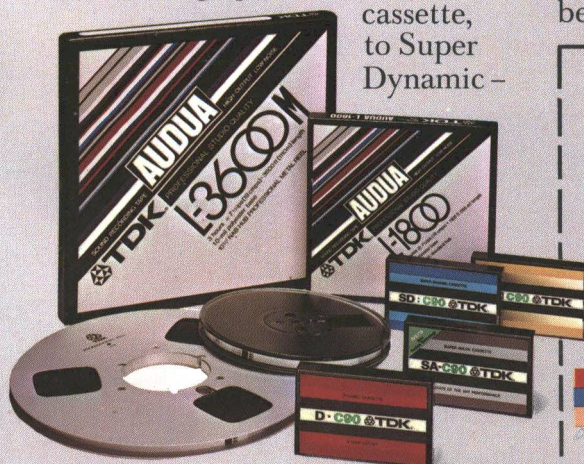
Super Avilyn's wide frequency range, low noise levels and high maximum output are all achieved with no more head wear than that of ordinary ferric oxide tape.

And if you think we're being a little hard on chrome tape, remember that the finest chrome tape of all was ours!

Whatever equipment you use, you can't be sure that you're getting the best from it until you've tried Super Avilyn. It has outstanding response across the entire frequency range, especially when used with a

chrome bias or 70 microsecond switch.

Rich, full sound, reproduced as faithfully as possible: this is our aim with every tape we make, from the high precision AUDUA cassette, to Super Dynamic –



the first of the hi-fi cassettes – to the superb AUDUA open-reel tape, which we consider to be the highest-quality tapes in the world.

Fill in and post the coupon for more details about SA, and our full colour brochure. See what TDK has to offer – then hear what you've been missing!

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TDK Tape Distributor (UK) Ltd., 341 Brighton Road,
South Croydon, Surrey, CR2 6EQ.
Eire: Peat Wholesale Ltd., Chapel Lane, Parnell Street, Dublin 1.

What do you do once you've designed the world's finest cassette decks?

If you're Akai you apply all the technological prowess gained in making cassette decks to the field of electronic design. And if you do that, and you're very very conscientious, you come up with the AA 1020 Receiver.

Because it's Akai's reputation for superlative hi-fi equipment that makes the AA 1020 the best buy in receivers.



AA 1020 RECEIVER

Angus McKenzie voted this receiver a 'best buy' in Hi Fi Choice and commented that the AA 1020 "Is very well styled and can be strongly recommended." It's an AM, FM and FM stereo receiver, delivering 20 watts per channel of continuous power, both channels driven into 8 ohms from 20-20,000 HZ with no more than 0.4% THD. Again, Hi Fi Choice said "It's main good points are the excellent sound quality on stronger FM stations, and the generally good sound quality produced by the amplifier." For a really clear, strong radio signal the AA 1020 features Phase Lock Loop integrated circuitry, with automatic Frequency control and a local/distant FM station selector. It also has a tape dubbing facility from tape 1 to tape 2, and visa versa, along with Phono and Aux inputs, and two tape inputs/outputs. This "strongly recommended" AA 1020 receiver offers you the kind of performance you've come to expect from the top class equipment that bears the Akai name.

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HPF1/2



**'One day, my son,
all this will be yours!'**

In a world where heirlooms have to be antique to be credible and durable consumer durables are hard to find, it's reassuring to know that 'built to last' can still mean what it says.

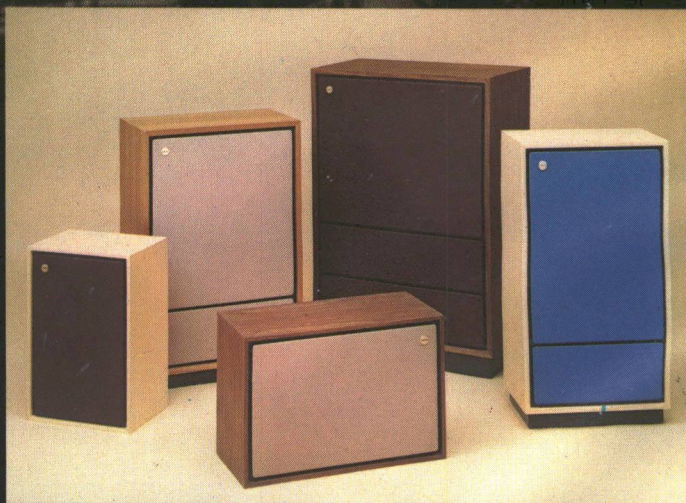
Look at our new range of Tannoy Loudspeaker Systems. We don't build them on the assumption that they will need replacing in ten or twelve years time. On the contrary, their standard of sound reproduction is so high and their built-in technology so advanced that they are unlikely to become outdated for a generation. It's hard to improve on near perfection.

And the proof is the many professional broadcasting and recording studios which use Tannoy Systems as quality monitors for accurate, natural sound reproduction.

There are five new enclosures to choose from, handsomely styled by one of Britain's leading industrial designers in ash, teak or oiled walnut finish and brown, blue or sand panel grilles. The speakers, with 50 years experience built into each one, are based on the dual concentric principle and feature our unique integrated loudspeaker system and famous crossover network.

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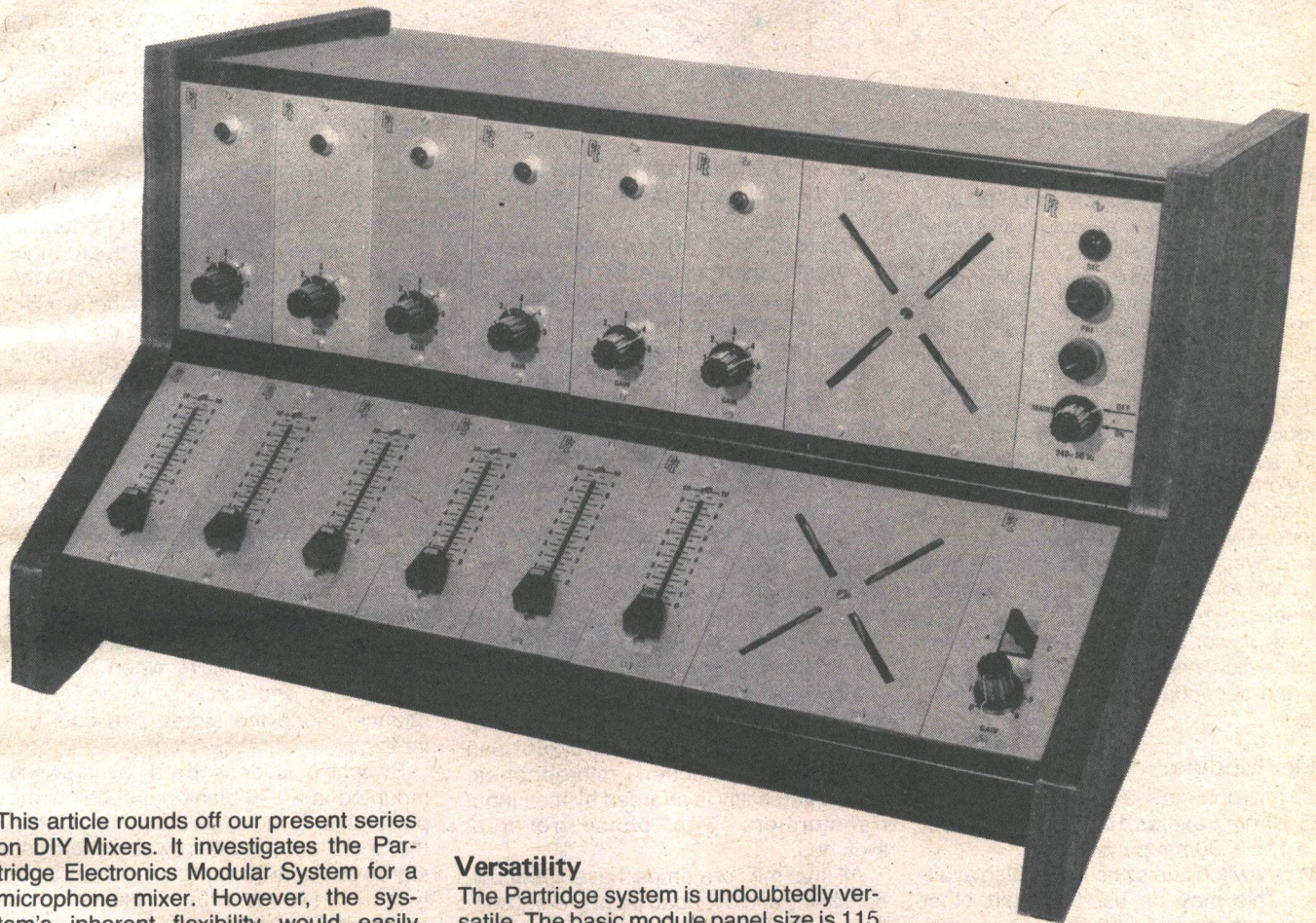
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TANNOY The name
says it all

QUADRAPHONIC MIX-UP

By M.G. Skeet



This article rounds off our present series on DIY Mixers. It investigates the Partridge Electronics Modular System for a microphone mixer. However, the system's inherent flexibility would easily allow it to be used for a programme mixer, as described in the November issue.

Its circuitry is switchable to give either a four channel or a stereo output. In the former mode, six microphone channels are mixable down to four outputs with two of the mics having 360° placing adjustment. When switched to give a stereo output four of the microphones are pan pottable across the stereo sound stage.

We intend, for a later issue, to investigate four channel DIY Dolby circuitry that looks like taking two forms; one as a built-in addition to this mixer and also as a separate unit. Noise build-up with multi-copy mix-downs indicates the need for this.

Beginners with little constructional experience may be put off at first. If the determination is sufficient, on acquiring the bits and pieces, things will fall into place, especially as construction proceeds. If enquiries are made of the author, by readers genuinely proceeding on construction, a stamped self addressed envelope is necessary.

Versatility

The Partridge system is undoubtedly versatile. The basic module panel size is 115 × 50mm, and these screw to a metal cross framed cabinet with wood veneered chipboard end sections. Electronic modules 'plug in' to the cabinet chassis properly. Flexibility of layout is possible, but to suit our relatively simple mixer, the layout of Fig. 1 was chosen.

Cabinet

The metal cross frame size chosen was one of 450mm giving a basic nine module width. The range, however, goes from 350mm (seven module width) to 1350mm (twenty seven module width). The other cabinet variations available are brought about by different shaped end sections. Some eight other forms are available, giving for example double module height and or double or triple module depth. The rear of the main metal cross frame is drilled for a variety of output sockets (DIN, Jack or Cannon). Channel input sockets are in each of the pre-amp modules concerned. The catalogue numbers, quantities and prices for the cabinet, as used, are listed at the end of the article. The

photograph, less most of the modules, shows the construction method. Fig. 2 shows the positioning of the cross frames.

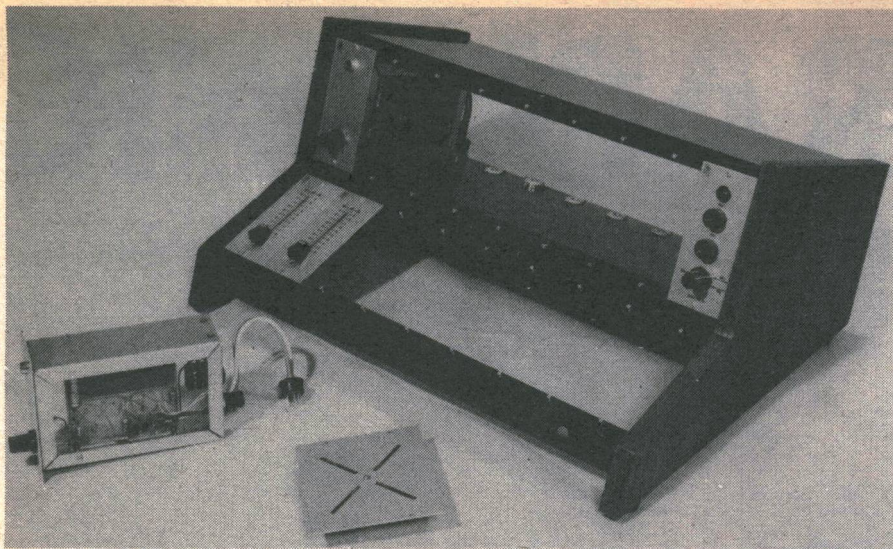
Electronics—Kit Presentation

Circuit and layout diagrams are supplied with resistors, capacitors, sockets, plugs, controls, PCB (all are standardised as 90 × 90mm irrespective whether mono, stereo or any type of circuit). This article is basically designed to augment the data supplied with each kit, plus describing the overall installation aspects and usage.

As an alternative to the kit approach, each module is available assembled and tested at appropriate higher cost.

Power Requirements

All electronic modules require +24V DC. Each PCB has supply decoupling resistance and capacitance, the latter comprising a 220μF electrolytic capacitor with 0.01μF disc ceramic in parallel. This decouples the module at RF where the electrolytic's inductance nullifies its effect.



The Partridge framework with modules being inserted.

Power Supply Module

A G36 (G35) power supply unit with standard transformer and module unit is fitted in the top right position on the cabinet framework. The panel size is standard 115 x 50mm, and the catalogue number in brackets refers to the circuit wiring within the module. There are three other sizes of power supply modules for larger installations; all are fully stabilized and smoothed, giving +24V DC. Each size is also available with a toroidal mains transformer which produces less external magnetic field, but in our application the standard version creates no problems. The power units can also be mounted external to the mixer, in a separate cabinet.

Each power supply module has mains on/off switch, neon 'mains on' lamp, primary and secondary panel mounted fuse holders.

Slider Module

Each microphone's level is controlled by a G25 60mm traverse 10k ohms log. slider on a 115 X 50mm panel.

Microswitch cue switching is also available. This may be used to start other equipment remotely in applications other than the subject of this article, cue in performers or to light a panel light to indicate that a channel is 'faded up'.

Virtual Earth Mixer Modules

Two C42 stereo virtual earth mixer PCBs are used. They also provide the desirable low output impedances on the mixer out-

puts. Up to 12 channels may be mixed on each circuit, giving plenty of extension possibilities.

The two C42 PCBs are not mounted in a module unit, but are fitted under the main 'chassis' member. The photograph of the underside of the mixer, in the early wiring stages, shows the positioning of the virtual earth mixer boards. Future versions of the C42 PCBs include provision for the mixing resistors instead of the use of separate boards as shown in the photograph.

Microphone Pre-Amp Modules

Four A21 (A17) 200 — 600-ohm unbalanced mic pre-amp modules are used for the basic 'four channel' microphones. The catalogue number in brackets refers to the PCB circuit part of the module.

Two A53 (A49) 2000 — 600 ohm balanced, extra high gain, mic pre-amp modules are used for the two 360° pan positionable injection microphones. Added versatility is afforded by their input transformers with phase reversal switches.

All the mic pre-amps have feedback sensitivity and overload point pre-set controls at the rear of the module and pre-set potential division gain controls on the module front panel. Apart from the former allowing more 'headroom' in the pre-amp, both allow the input to be tailored so that the channel fader proper is used over its full travel. In the case of the A53 (A49) modules, the circuit and layout diagram shows a three position switched feedback

sensitivity control. To retain uniformity with the other four mic channels a rotary pre-set can be provided instead.

The mic modules are normally supplied with 5-pin DIN sockets. Alternative types, ie, jack sockets are available on request. It is probably best to make these jack sockets 3-way and then even in the unbalanced A21 instance balanced mics can be directly plugged in and worked unbalanced. Similarly in the balanced A53 case, unbalanced mics on two-way jack plugs are able to be directly plugged in.

Four Channel 360 and stereo panning arrangements

For the former we thought we would try and alternative to the usual 'joystick pan-pot'. The photographs show two sets of four 'roll pots' in a star formation. This system is satisfactory where there is no requirement to move sound images around. If one imagines one is sitting centrally to the four loudspeakers, ie, at the star centre, then to get a right front position for the sound usage, the appropriate pot is moved outwards. To get a 90° to the RH side image position then the two RH roll pots are actuated and so on.

The system limitation appears, however, when an 'in the head' image is needed — all the four roll pots must be moved outwards.

Two blank J71 anodised aluminium panels 115 x 100mm are used and the roll pots are mounted as shown in the photographs after slots have been cut in a star formation.

The J71 panels also house the stereo pan-pots for mics 3 to 6 inclusive, used when the mixer is switched to stereo. The roll pots are ineffective when this has been done, and similarly, when in four channel mode the stereo pan pots are ineffective.

Switching is done by a lever switch mounted in a J70 blank panel below the power unit. At the stage the photograph of the installed modules was taken the stereo pan pots had not been added to the two J71 115 x 100mm panels. It is ergonomically sound to fit them in line in the 'front' and 'rear' vee positions between the four channel roll pots.

Interpreting the circuit plan

The block diagram, Fig. 3, is drawn with the four channel/stereo switch in the four channel position.

Consider the channel routings, first of

Fig. 1. Layout of modules on the 450mm cross frame

Unbal. mic preamp A21	Unbal. mic preamp A21	Unbal. mic preamp A21	Unbal. mic preamp A21	Bal. mic preamp plus phase switch A53	Ch5 360° 4-ch positioning and Chs 3 & 4 stereo panning J71	Mains to +24V power unit G36
Ch1 slider G25	Ch2 slider G25	Ch3 slider G25	Ch4 slider G25	Ch5 slider G25	Ch6 360° 4-ch positioning and Chs 5 & 6 stereo panning J71	4-ch or stereo switching J70

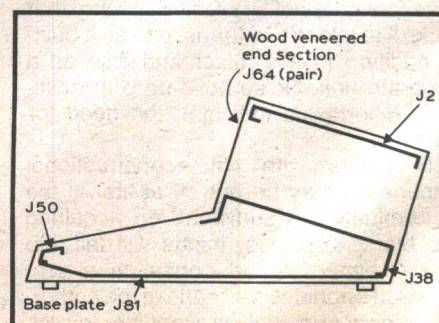


Fig. 2. Identification of cabinet parts.

all, in the four channel mode. Mics 1, 2, 3 and 4 are connected to the front left, front right, rear left and rear right outputs only. These four mics are the coincident 4-channel mics. Mics 5 and 6 can be directed by their four roll pots to any output or combinations of outputs. These then are the spot or injection mics in the 4-channel mode.

When the mode switch is in the stereo position, the following routings apply. Mics 1 and 2 are connected to the stereo left and right outputs — these mics being the coincident stereo pair. Mics 3, 4, 5 and 6 can be directed independently anywhere in the stereo sound stage by their respective panpot. These can be used as spot or injection mics, or formed into L and R pairs for use as additional coincident stereo pairs for ambience pickup or choral reinforcement.

Earthing, neg. and pos. 24V wiring

The only connection of signal earthing (electronic earth) to the metal of the mixer chassis should occur at the 'front' output socket. The signal earthing should then follow the signal paths, often in the necessary screened leads, in the connections back through the mixer.

In the G36 power supply module is an optional chassis earth tag. Do not connect the -ve rail of the supply to this tag.

The negative and positive 24V are brought out of the power supply unit to its socket at the rear of the chassis, the pin allocations based on those usually used by Partridge Electronics being shown in Fig. 4. It is from the power supply unit's socket that connection is made to all other places needing - and +24V.

Other Partridge facilities

Should readers be prompted to go beyond the basic mixer being described, then the Partridge Electronics Catalogue details items such as magnetic pick up modules, tape head replay pre-amps, bass, middle, treble equalization arrangements, autofade, compressor limiter, audio monitors for PFL, talk-back, line-up oscillator, VU, LED or PPM metering.

Coupling in to the recorder

The relationship between the mixer and the recorder can affect the potential results in a number of ways. Basically it is all a matter of choosing an appropriate input sensitivity and setting the record gain correctly to avoid hiss or distortion.

Connect the mixer to the recorder with

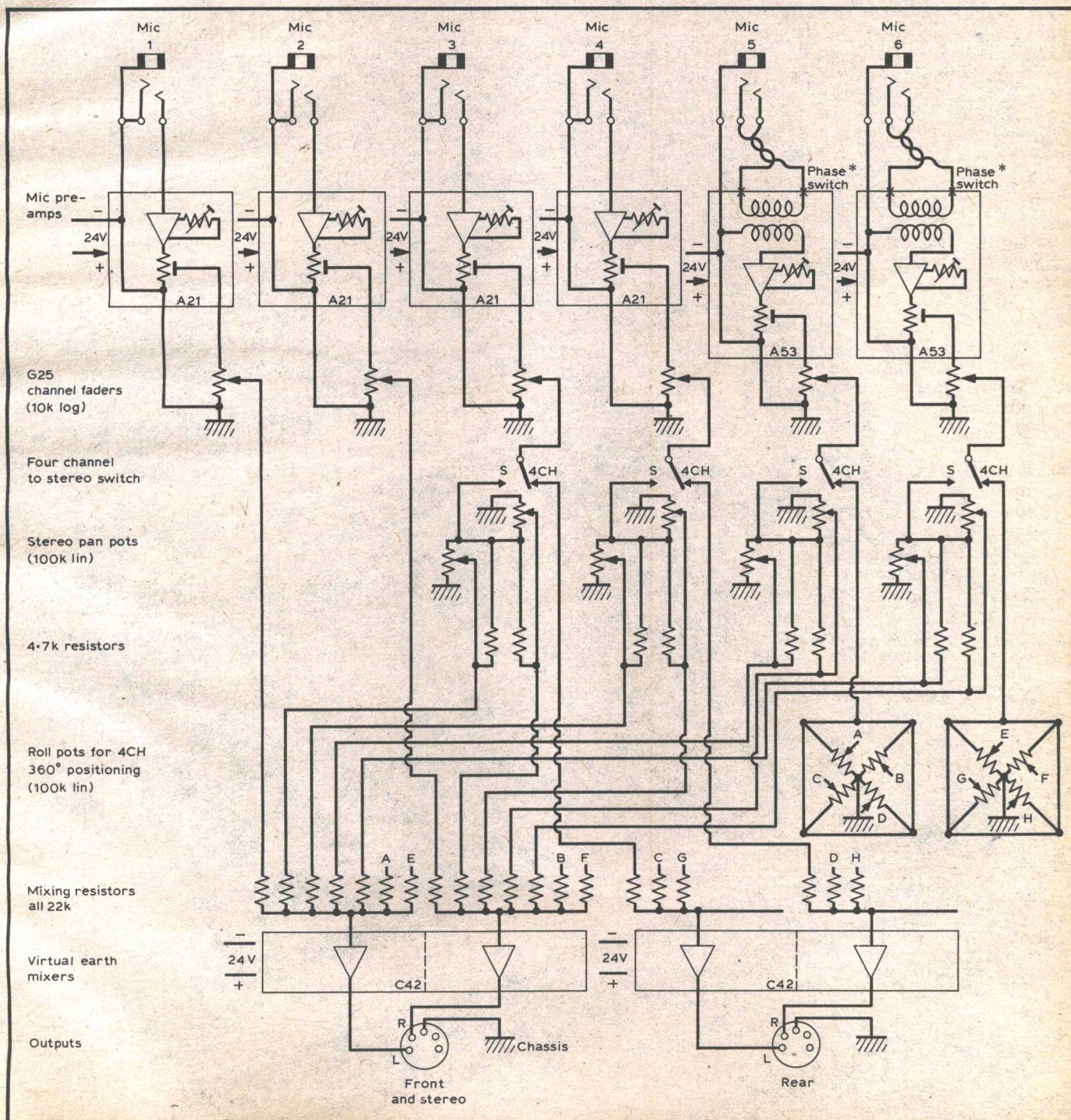


Fig. 3. Electrical layout of the entire mixer.

To really appreciate the BSR McDonald BDS 95 you need better than average hearing.

It's unfortunate, but when you bought your first hi-fi system, you may well have had ears to match.

Then as time's gone by you've begun to notice the imperfections. We made the BSR McDonald BDS95 belt drive turntable with you in mind.

It means you've not only moved up to a turntable that meets the most exacting standards of design and performance, but you still have a turntable you can really rely on.

So let's take a closer look by lifting the friction hinged lid, which stops at any angle on the slimline plinth.

Notice the 'S' shaped, low resonance, polished aluminium tonearm, which floats in a concentric gimbal style mount.

The counterbalance for primary weight adjustment, and micro-balance obtained by the ultra-fine rotary control.

Now let's get things in motion using the viscous cueing device, and discover the great combination of silent power transmission and ultra-modern styling.

The discerning eye will spot features such as the bias compensator that equalises stylus pressure on both sides of the groove, and the special lightweight headshell with its ADC K3E induced-

magnet cartridge and elliptical stylus. We're sorry if all this leaves you with a feeling of deep dis-satisfaction, but we did warn you.

And yes, the BDS 95 will simply plug straight into your system.

If you are in any doubt about compatibility just write to Richard Jones at the address below.

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Cradley Heath, Warley,
W. Midlands, B64 5QH.



all channel sliders out and while monitoring off tape (Dolby on, if fitted on the recorder), set the recorder's input gain just below where hiss from the mixer is discernable. Oh yes — you will hear hiss if you amplify too much in the recorder!

The noise performance of the system is now limited by the mixer's mic pre-amps and the levels put into them by the mics.

Before relating figures for noise and other performance aspects, consider the position of the recorder's input controls. They are unlikely to be too high as any recorder pre-amp hiss would have been heard in the setting up and the control 'backed away' (Who would like to join my Society for the Bypassing of Mic Pre-amps for Line Inputs?). The controls may, however, be too low, not allowing easy tracking out, or when the input is fully modulating the tape the recorder's pre-amp may overload. A less sensitive input is indicated or attenuation is needed.

Performance

Taking 1mV at 1kHz as a general mic level on voice, the following aspects were measured using a Ferrograph RTS2 oscillator, mV meter and distortion measuring set.

The signal-to-noise ratio with respect to one volt output with a 220-ohm source impedance, on any of the inputs, was 60dB unweighted. There was no hum content of any consequence. The figure is a very good one and is only some 5dB worse than some state-of-the-art figures

encountered. Bear in mind that in music situations mic outputs in excess of 1mV are the rule especially with capacitor mics, so in effect signal-to-noise ratios of 70 to 80dB are easily realised before the recorder has its noise-producing effect.

Mic input overload is a worry, but not so in this mixer's case. The rear of the module feedback pre-sets allow tailoring of sensitivity and overload point. The A21 overload point ranges from 7.6mV to 185mV at its sensitivity extremes. Figures for the A53 modules are 8.5mV and 72mV respectively.

The A53 modules give some 8.5dB more gain than the A21 types. Position 4 out of 6 on the front panel presets equates the gain with the A21 level.

The mic pre-amp modules suit 200-ohm to 600-ohm microphones. AKG D202 moving coil and Calrec CM 652D capacitor mics have been used. The latter, being higher output need the pre-amp sensitivity feedback control set at reduced sensitivity. Distortion figures measured through the complete mixer at the signal levels normally encountered are around 0.1% THD at 1kHz.

Overall frequency response figures with the feedback sensitivity controls rotated 25% off full sensitivity produce — 1dB points at 27Hz and 22kHz for the A21 module, and at 45Hz and 27kHz for the A53 module. The latter's input transformer limits the LF response a little in comparison with the A21 module.

Will it work?

Just posing this question could itself indicate that there is some doubt! The short answer is, of course it will work. There is the chance of the odd wiring error, depending on experience, but on the side of success is the modular nature of construction. If, for example, one pre-amp does not perform you can find the source of trouble by plugging another into the same position. Immediately one knows the general direction of trouble. We will close repeating the encouragement in an early paragraph — as the job proceeds then so it all falls into place, even though at the beginning it might look somewhat daunting.

Parts List and Quantities

Cabinet		Qty.	Price (each)
Veneered end section	J65	1 Pair	£10.70
Top cross frame 450mm	J2	1	£5.07
Main cross frame 450mm	J38	1	£8.84
Front cross frame 450mm	J50	1	£4.42
Alloy base plate	J81	1	£2.00

Mic pre-amp module kits

200 — 600	4	£11.04
Unbalanced Mic A21		
Pre-amp plus module		
Specify type of input socket		
150 — 600Ω bal. (extra) A53	2	£23.35
High gain mic pre-amp plus module and potentiometer feedback sensitivity control		
specify type of input socket		

Virtual earth PCB kits

Stereo virtual earth mixer C42	2	£9.08
--------------------------------	---	-------

Slider Fader

Standard slider fader with G25 knob and 115 x 50mm panel	6	£3.21
--	---	-------

Blank Panels

115 X 50mm	J70	1	£0.78
115 X 100mm	J71	2	£1.17

4CH/Stereo switch

4 C/O lever switch with panel and knob	1	£4.60
--	---	-------

4-channel positioning

Ruvido Roll Pots, 25k Lin, not available from Partridge Electronics. Enquire from Electrositic Ltd., 20 Wilbury Grove, Hove, Sussex BN3 3JQ.

Stereo Panning Controls

	Qty.	Price Each
100k ohms ganged with linear rotary pots resistors and knobs	4	£1.25

Power supply unit module

240V AC mains to +24VDCG36	1	£16.45
Stabilised and smoothed, with module		

Supplier

Partridge Electronics, 21-25 Hart Road, Benfleet, Essex SS7 3PB.

Ordering Procedure + VAT at 12½% and carriage as follows:

Postage & Packing £2.00 on any order under £10.00

Postage & Packing £2.50 on any order under £25.00

Postage & Packing £3.00 on any order under £50.00

Postage & Packing £3.50 on any order under £100.00

Postage & Packing free on any order over £100.00

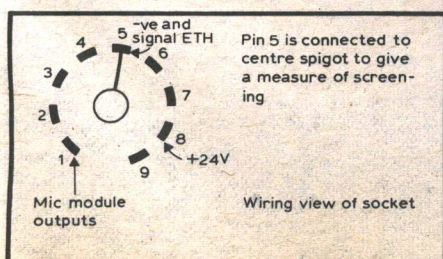
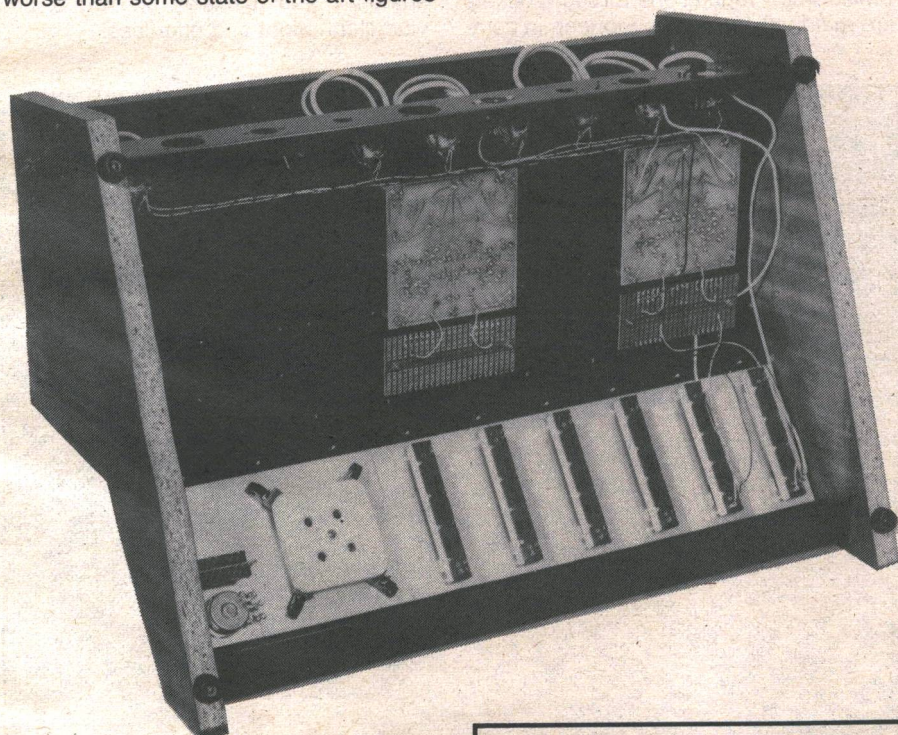


Fig. 4. Module chassis socket pin allocations.

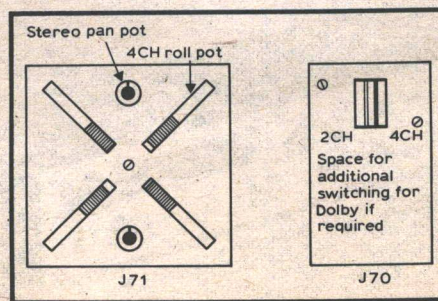


Fig. 5. Positions on J71 and J70 blank panels for pan and roll pots, and mode switching.

SYSTEM FOR PLEASURE

by David Wren

No. 2—for the budget conscious

At a total discount price of around £310 (taking into account the new VAT rate), our second 'System for Pleasure' would suit the budget conscious enthusiast with a room of up to 3500 cubic feet.

Equipment line-up is the Pioneer SA 7300 amplifier with matching TX 5300 tuner (this may be added at a later date if the budget is tight initially), Pioneer PL 15R turntable, Audio Technica AT-13e cartridge and RAM Bookshelf speakers.

Amplifier

The output of the Pioneer SA 7300 amplifier is quoted as 35-40 watts RMS/channel into 8 ohms. It is neatly finished in brushed aluminium with matching controls and a black 'crackle' case. All of the facilities we have come to expect from

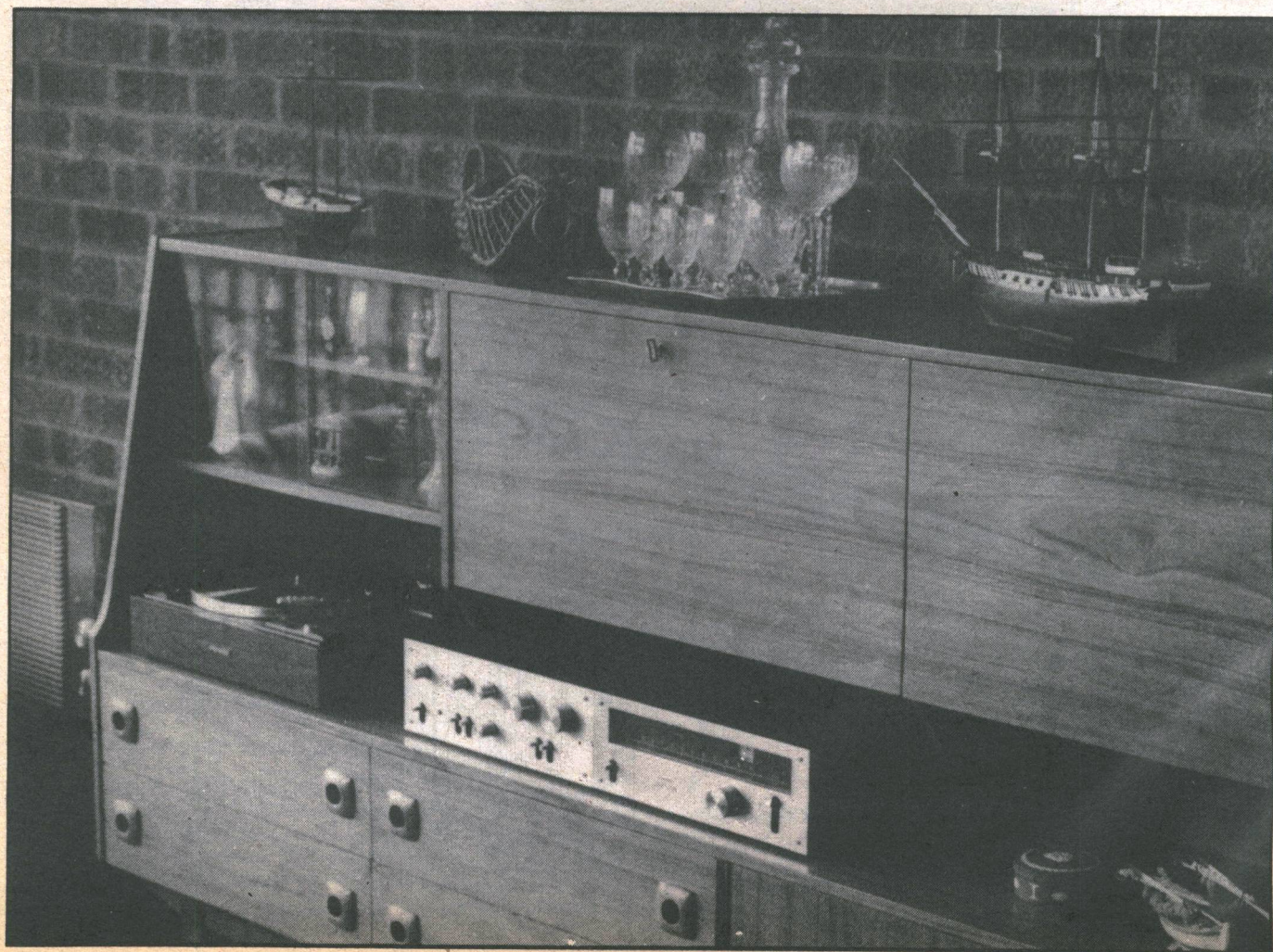
Japanese equipment are provided — switching for two sets of speakers and two tape machines. Tone controls have click positions and a handy cancel switch. There is the obligatory ineffectual 'loudness' control, a headphone socket and power switch with associated protection circuit for speakers and amplifier.

On the rear are Phono sockets for all sources plus a duplicated DIN socket on the 'Tape 2' position, screw terminals for the speakers and one for an 'earth' connection.

The only gripe I have with the amplifier concerns the complete lack of power output sockets, but this is almost completely beyond Pioneer's control. Under new British safety regulations, all such sockets are ruled unsafe and so Pioneer, in com-

mon with many manufacturers, have been forced to remove the offending sockets and blank off the resultant hole. The hapless owner is now in the position of having perhaps four mains cables (amp, tuner, turntable, tape machine) to connect together somehow and personally I feel this is potentially more dangerous than the outlawed mains outlets, which are only dangerous if fingers are poked in the wrong place with the equipment connected to the mains. As it is, the chances of making faulty and perhaps lethal connections are increased.

The amplifier performed faultlessly for the period of test. Facilities provided were adequate — all controls operated smoothly and precisely and the sound was clean, tight and effortless.



Tuner

The Pioneer TX 5300 tuner matches the amplifier in appearance and caters for FM stereophonic broadcasts and medium-wave AM transmissions.

Front-panel facilities include a large clearly calibrated scale, stereo indicator, lighting to show the presence of a stereo signal, centre-tuning meter for FM which doubles as a signal-strength meter for AM and a 'muting' switch to reduce the noise when tuning between FM stations.

All the latest technical innovations are incorporated — integrated circuits, phase-locked loop decoder and FET's. The tuner undoubtedly worked well, even with just the supplied wire dipole draped over a doorway and tuning was easy and accurate with the flywheel assisted control and centre-tuning meter. The tuner performed as well as any I have heard on AM transmissions.

Turntable

A great many people favour automatic or semi-automatic turntables, so the Pioneer PL 15R was chosen, though the manual PL 12D would be a suitable alternative. In fact the two are virtually identical, both being belt-driven and with a 'bangs' and 'thumps' in the speakers.

It is a very neat and simple turntable, having dimensions of 430 mm(W) × 166 mm(H) × 355 mm(D). The wooden plinth is walnut and there is a tinted Perspex cover which hinges up or lifts off if space is restricted. Installation and setting-up procedure is straightforward and clearly explained in the instruction booklet.

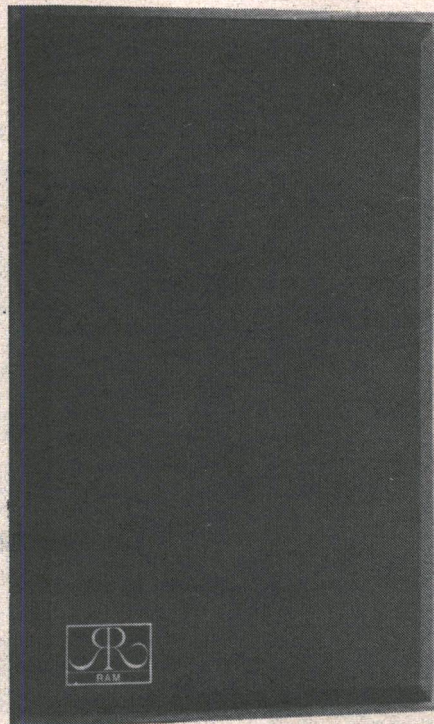
Cartridge

The Audio Technica AT-13e cartridge was recommended by Shiro (the impor-

ter) as being suitable for the PL 15R and indeed the combination worked well. The arm was precise and fairly delicate in operation, though not sufficiently so for really high compliance cartridges. However, the AT-13e is ideal and coped well with all but the most difficult of records at 2 grams with a clean, open and bright sound, comparing favourably with other well established models.

Speakers

The RAM Bookshelf is a compact speaker measuring 16(H) × 10(W) × 8¾(D) inches and is designed for shelf mounting or may be used on the chrome stands supplied as an extra by RAM. If stand



mounted, the bass control should be wound up a couple of notches to compensate for the falling bass response inevitable with a small speaker. In a corner or on a shelf the bass is boosted anyway, so correction is not required.

The review speakers were immaculately finished in American Walnut but they are also available in teak, rosewood and mahogany. Internally and externally the standards of construction were high and the appearance received favourable comments, especially from female observers — an important point to note by any audio enthusiast with a wife.

There are two drive-units in the reflex-loaded (method employed to improve the bass performance) cabinet, an 8-in. Bextrene-cone bass/mid driver and an Isophon dome tweeter modified by RAM. The simple modification is undertaken by several manufacturers and effectively removes a 'sting' in the response of the standard unit.

Sensitivity is average and the speaker is rated for use with amplifiers between 15 and 60 watts RMS when playing normal music and speech so is well suited to the 40 watt rating, though corner placement boosted the already healthy bass output slightly too much on certain material for my taste.

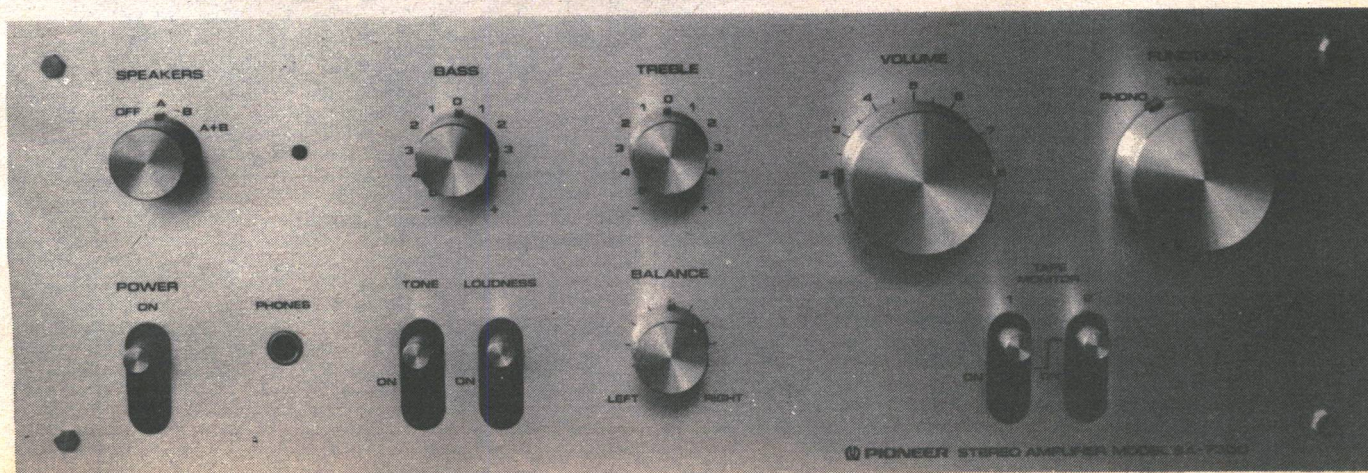
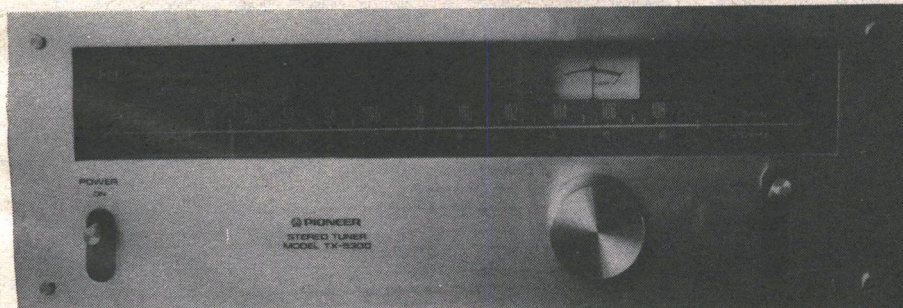
Although a small speaker, the Bookshelf has a 'large' sound and must be recommended to people with big ideas but little space and at £75 + VAT there is very little competition.

Conclusion

There were no problems with the installation and operation of this system, apart from the mains connections mentioned earlier and judging by the quality of construction of the various units, this system should have a long and useful life.

The overall sound was clean, accurate and pleasant and it just remains for interested readers to hear and judge the equipment for themselves.

Since this system was assembled and tested, Pioneer replaced the PL12D by the PL112 and the PL15R by the PL115. Their substitution in this system should cause no problem — in fact the improved specifications will show advantage.



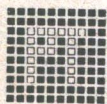
CEC turntables make just the DIN you want

The drive system on the five-model range of CEC turntables meets DIN 45 : 507 on wow and flutter and DIN 45 : 539 on rumble, with performance to spare. Four-pole synchronous motor, flat-belt drive and dynamically-balanced platter help to ensure this. You can expect superb quality from any CEC product, because it's made by turntable specialists.

But there's an interesting bonus – CEC tables are fitted with the world-famous Ortofon cartridges, F 15 0 on three models and F 20 E0 on the electronic speed control version.* That means the highest standards in trackability, frequency response and channel separation.

Prices range from around £63.61 to £136.54,* and the CEC range comes with our no-fuss 12-month parts and labour guarantee.

**Lowest-priced model, BD1000, fitted with MC11 Cartridge*



CEC

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Newcastle, Staffs ST5 0SW

A member of the Photopia International Group of Companies – which ensures a fast and efficient after sales service at all times.

Name

Address

*Guide Price, incl. VAT but ask your dealer for his price and a demonstration, or call into our London showroom 235 Regent Street, W.1.

HFP MUSIC SYNTHESIZER

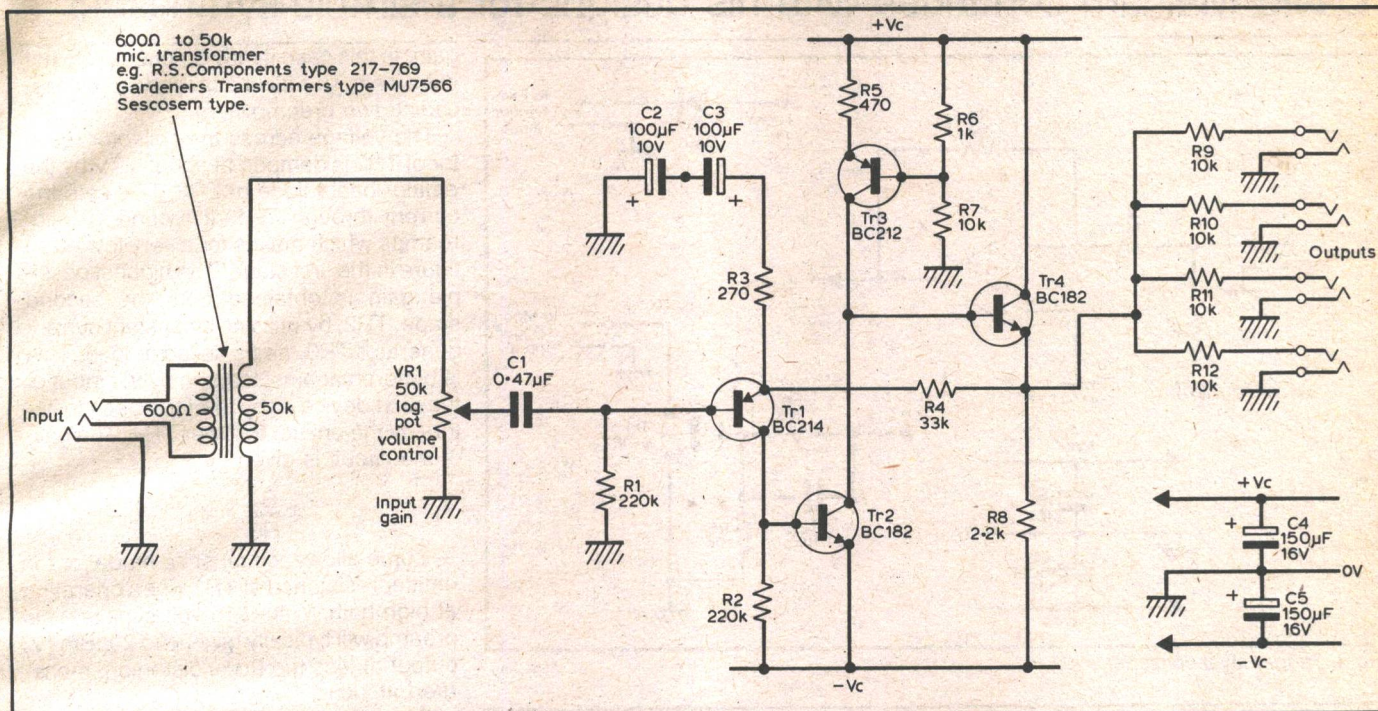


Fig. 1. To feed a microphone into the synthesiser all that is required is this simple preamplifier.

This article deals with a number of different circuits for interfacing the HFP synthesizer with other sound sources and synthesizers. The first unit is a microphone preamplifier, the circuit of which is shown in Fig 1. The basic preamp is a high quality 40dB gain amplifier which with the addition of a matching transformer becomes a 60dB gain, balanced input preamp. Use of a balanced input is advantageous with professional type balanced microphones as it gives a useful degree of hum cancellation. Most amateur microphones are unbalanced so the transformer really only adds some

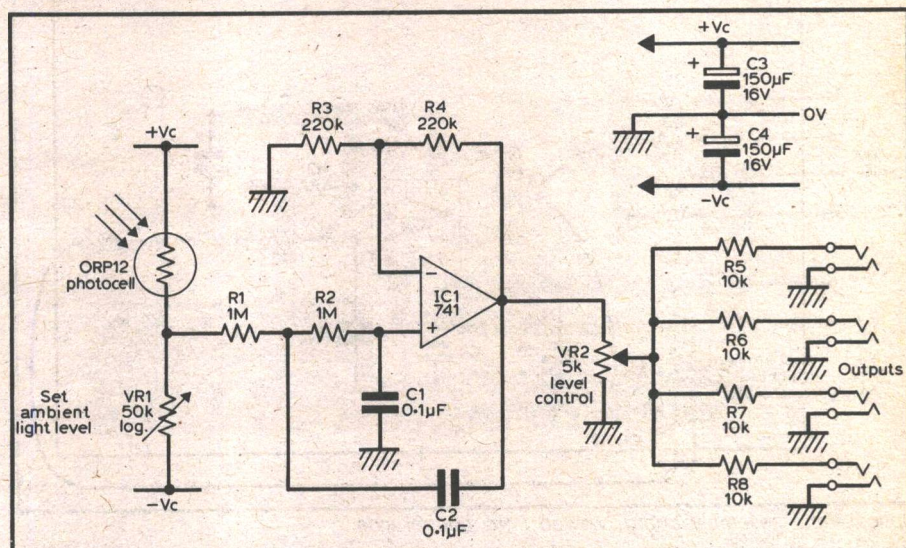


Fig. 2. An optical input requires a simple IC preamplifier.

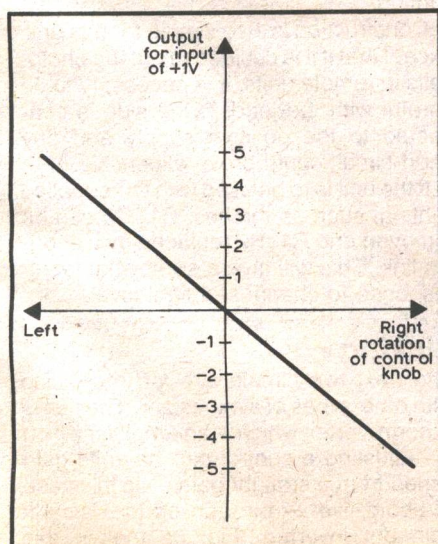


Fig. 3(a). Gain function of VRI, Fig 3(b).

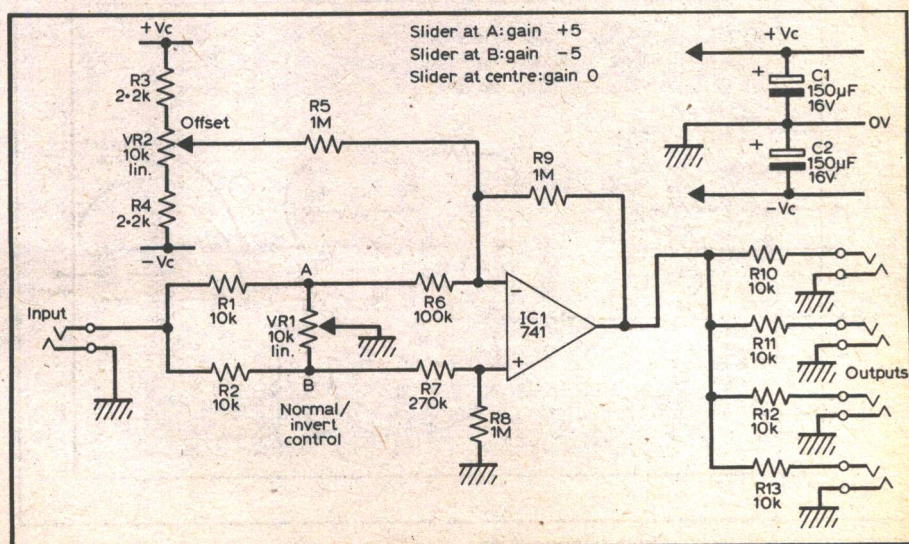


Fig. 3 (b). A norm-verter, used for matching into a different synthesiser.

PART 10 INTERFACING CIRCUITS

David Malham continues with his designs for a simple synthesizer

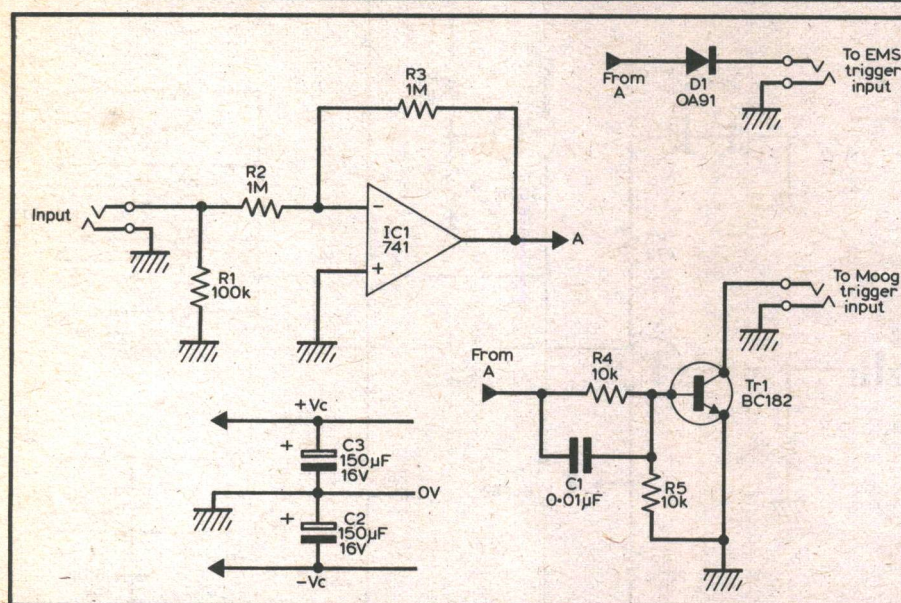


Fig 4. Trigger level converter.

gain. In this case it may be cheaper to get extra gain — if it is necessary — by cascading two preamplifiers.

The voltage across the collector resistor of TR2 is damped at about 0.7V by the emitter-base diode of TR2. This sets the current through TR1 at around 10 microamps which makes for a very low noise figure in the first stage. The highest possible gain is obtained from the second stage, TR2, by utilising a constant current generator TR3, as its collector load. This is buffered against loading by the input of the next device or by the feed back resistors by the emitter follower TR4. The gain of the circuit is given by

$$\frac{R4}{R3} + 1$$

— some allowance must be made for the emitter resistance of TR1 when operating at high gain. With ± 15 volt supplies this preamp will typically give up to 20dBm (V) output at less than 0.1% distortion, measured at 1kHz.

Construction is straight forward, the PCB design given being for a pair of preamps. The input connectors used will of course depend of what you have on your microphones but standard 0.25in jack plugs are to be preferred for unbalanced units and Cannon (XLR) plugs for balanced ones.

Light control

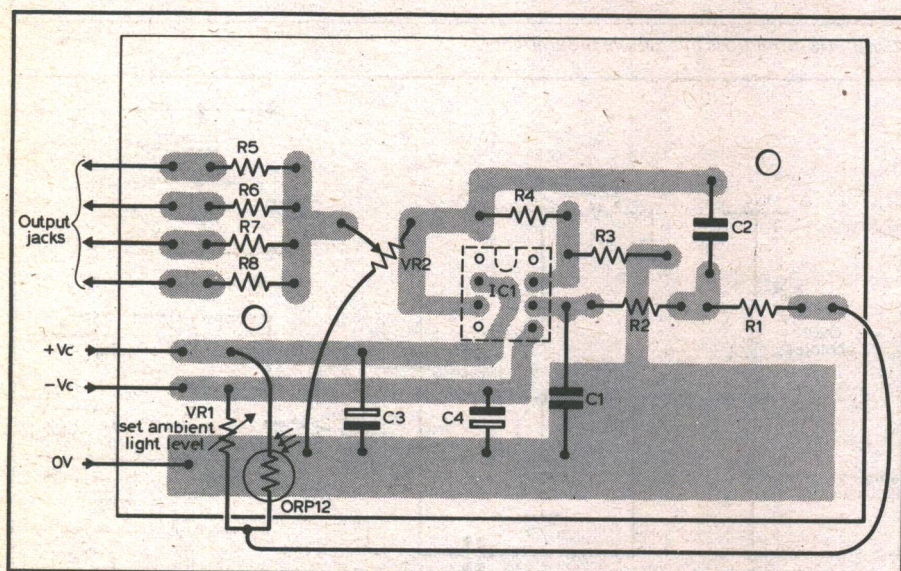
The next unit is a very simple one for a light modulated input. It uses a cadmium sulphide photocell whose resistance varies with the brightness of the light falling on the cell, to generate a voltage corresponding to that brightness. The circuit is shown in Fig 2. The control VR1 corrects for the ambient light level and should be adjusted to give optimum sensitivity to variations in light level. The op-amp which buffers the output of the photocell is connected as a low pass filter (see article 2) to reduce the effects of hum caused by AC lighting.

Construction is also simple for this unit, except that if it is decided to put the photocells in remote units, it is necessary to be careful with the leads. One side is connected to the positive supply and any short circuit could prove expensive.

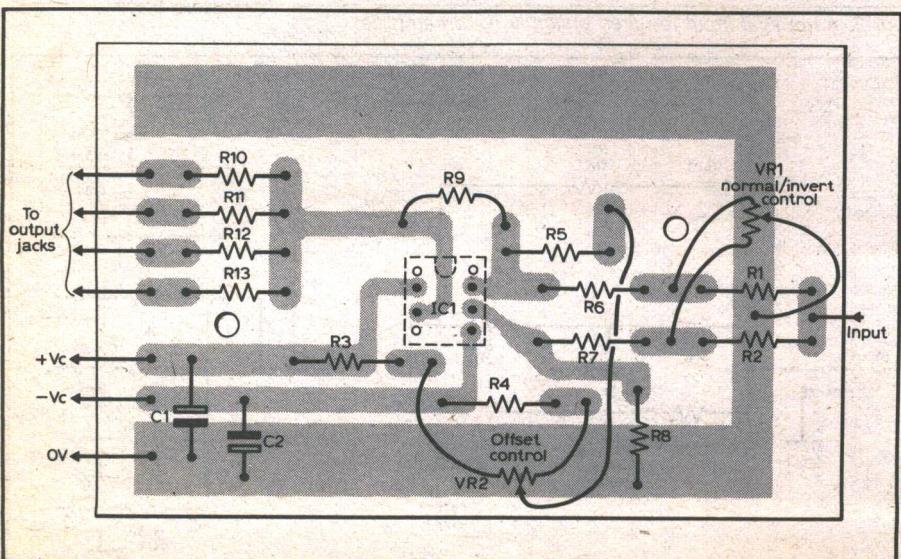
If the unit is to be used with DC supplied lighting, such as torches, C1, C2 can be removed and R1, R2 replaced by a shorting link. This will give a somewhat faster response to changes of light level.

Linking

The next two circuits are for interfacing with other types of synthesizer. The first is a 'norm-verter' which is an amplifier which by adjusting a control can have its gain varied from a straight gain — in this case of about five — through off to a similar gain but inverted. Fig. 3a makes this



Optical input assembly board, viewed from copper side.



Normverter board, viewed from copper side.

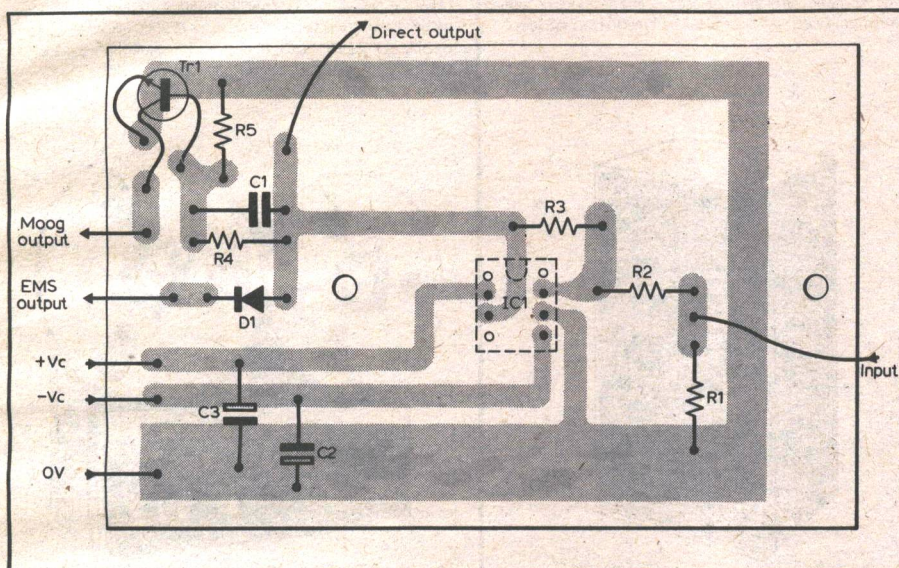
somewhat clearer. The purpose of this unit is to adjust the varying standards of control voltages available in different types of synthesizers to the one used in the HFP synthesizer. It can also be used in reverse to drive other synthesizer designs from the HFP design. It is, of course, a very useful unit in its own right for use within the synthesizer to provide various special effects. The full circuit is shown in Fig. 3b. VR1 controls the amount of amplification and whether the output is normal or inverted. VR2 is an additional control which allows you to offset the output voltage to either side of earth. Its operation is not affected by VR1.

The second unit is for converting trigger levels from one synthesizer to another. The circuit is shown in Fig. 4 and it can be

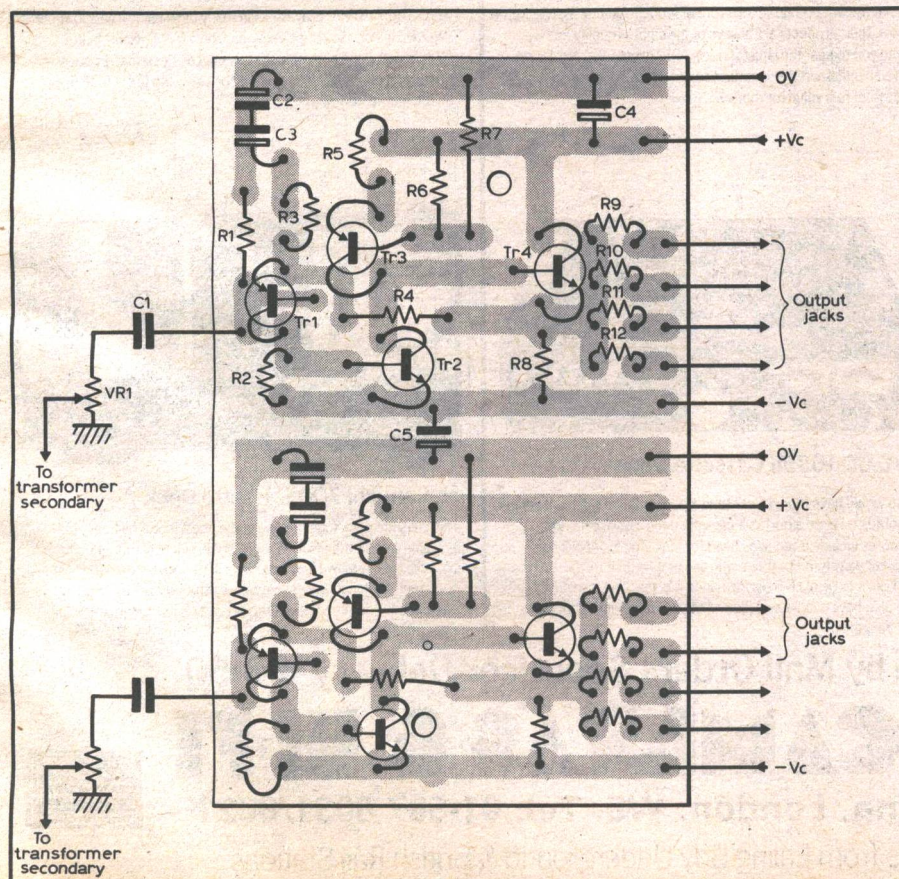
seen that it is just a simple inverter with various output stages. The EMS series of synthesizers (VCS 3 etc.) use a diode isolated 5 volt pulse so the inverter is used with a diode in series to drive EMS envelope shapers from HFP trigger pulses. To go in the opposite direction, just use the inverter.

Moog envelope generators use a switch closure for triggering so a transistor output is used on the inverter to simulate this. In the reverse direction the footswitch input of our envelope generator can be used.

There are so many other designs that it would be impossible to give exact details of interfacing requirements but the above units should cover just about everyone's needs.



Trigger level converter printed circuit board.



Microphone preamplifier. Unmarked components are as other channel.

COMPONENTS LIST

PREAMP (one channel only)

Semiconductors

- 2 — BC 182
- 1 — BC 212
- 1 — BC 214

Resistors

- 2 — 220kΩ
- 1 — 33kΩ
- 5 — 10kΩ
- 1 — 2kΩ
- 1 — 1kΩ
- 2 — 470Ω
- 1 — 270Ω
- 1 — 50kΩ log. pot.

Capacitors

- 2 — 100μF 10 volts
- 1 — 0.47μF

Miscellaneous

- 1 — input transformer 600/50K
- 1 — input connector to suit mics.
- 4 — 3.5mm Jack sockets
- 1 — knob
- 1 — 5-pin DIN plug
- 1 — 5-pin DIN socket
- 2 — 160μF 16V elec.
- 1 — box.

All
¼W 5%
unless
otherwise
stated

Common
to
both
channels

OPTICAL INPUT

Semiconductors

- 1 — 741
- 1 — ORP12 photocell

Resistors

- 2 — 1MΩ
- 2 — 220kΩ
- 4 — 10kΩ
- 1 — 50kΩ log pot
- 1 — 5kΩ log pot

Capacitors

- 2 — 0.1μF
- 2 — 150μF 16 volt elec.

Miscellaneous

- 1 — knob
- 4 — 3.5mm Jack sockets
- 1 — 5-pin DIN plug
- 1 — 5-pin DIN socket
- 1 — box

All
¼W 5%
unless
otherwise
stated

NORM-VERTER

Semiconductors

- 1 — 741

Resistors

- 6 — 10K
- 3 — 1MΩ
- 2 — 2kΩ
- 1 — 100kΩ
- 1 — 270kΩ
- 2 — 10kΩ lin. pot.

Capacitors

- 2 — 160μF 16 volt. elec.

Miscellaneous

- 5 — 3.5mm Jack sockets
- 2 — knobs
- 1 — box
- 1 — 5-pin DIN plug
- 1 — 5-pin DIN socket

All 5% ¼W
unless
otherwise
stated

TRIGGER LEVEL CONVERTOR

Semiconductors

- 1 — 741
- 1 — BC182
- 1 — OA91

Resistors

- 1 — 100KΩ
- 2 — 1MΩ
- 2 — 10kΩ

Capacitors

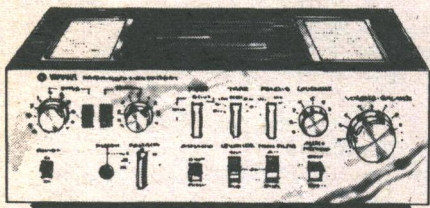
- 1 — 0.1μF
- 2 — 150μF 16 volt. elec.

Miscellaneous

- 3 — 3.5 mm Jack sockets
- 1 — Box
- 1 — 5-pin DIN plug
- 1 — 5-pin DIN socket

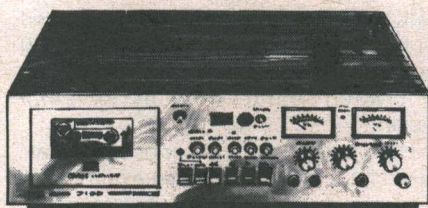
All ¼W 5%

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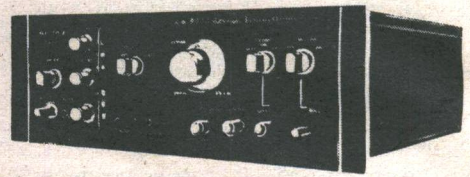
Yamaha CA1000 Amplifier

A superbly designed 'state of the art' amplifier with a host of features (note: all extremely useful and not just for effect like so many amps today). The CA1000 is capable of producing a massive 78 watts per channel into 8 ohms which makes it ideal for driving inefficient speakers. As always, Yamaha equipment is not only technically well designed but is also extremely attractive visually.



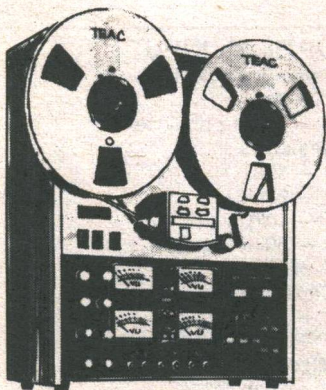
Akai GXC 710D Cassette Deck

We feel that this model is the finest that Akai has produced yet. If you like the design of the front load cassette deck look no further, the performance is very close to the best reel-to-reel machines.



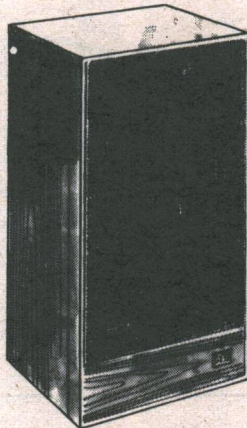
Sansui AU9900 Amplifier

We have long been admirers of Sansui equipment, but the latest range is especially exciting. From the BA5000amp which delivers a tremendous 300 watts per channel to the AU9900 (illustrated) capable of a mere 90 watts per channel! The whole range has the stamp of Sansui's expert technical and engineering skills.



TEAC A3340S 4 Track Tape Recorder

A tape deck for the connoisseur. We have a number of Teac models in stock, but would particularly like to draw your attention to the A3340S which has a truly remarkable performance with either 7 1/2 or 15ips speeds and using the recommended Maxell UD tape.



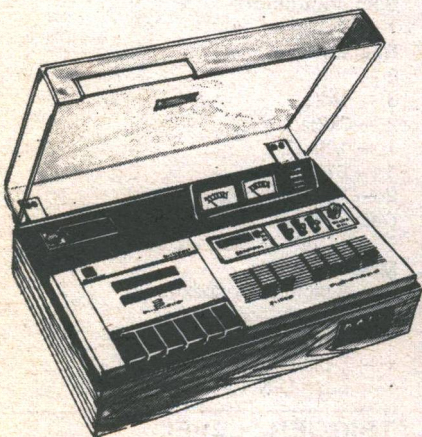
AR12 Loudspeaker

AR have now been at the forefront of loudspeaker design for some years. Their products are always of the highest quality and we invite you to hear the latest models AR12 (illustrated) and AR14 both have an uncoloured and natural sound which, for the price, represent real value for money.



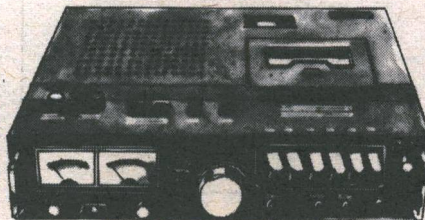
Revox A77 Tape-Recorders

Revox, the reference standard for studio tape decks for many years. The 77 series is available in many different formats in either 3 3/4/7 1/2ips or 7 1/2/15ips versions. Dolby B is available in the A77 deck and the performance can only be described as superb. Not cheap, but then you are buying possibly the finest tape deck on the market today.



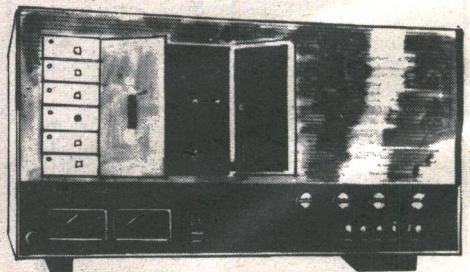
Aiwa AD 1600 Cassette Deck

Aiwa have steadily built a reputation second to none in the cassette deck field. The models AD1600 (illustrated) and AD1800 have both been highly praised by the Hi-Fi press and deservedly so, for they have a specification which is truly met and which competitors are finding hard to match.



JVC CD 1635II Cassette Deck

Who would have thought possible a performance like this could be obtained from a portable cassette deck a few years ago. Features include a sen-alloy head for long life plus ANRS noise reduction system. For those who like to take their music with them and like it to be of Hi-Fi performance this machine is a must. We also have a large selection of other equipment from the JVC range.



Nakamichi 700 Cassette Deck

This cassette deck must be one of the finest if not the finest available in the UK. Sets a standard not previously thought possible for the slow 17 1/2ips cassette speed. Rivals even the best open reel machines. Expensive, but worth every penny. Drop in and ask for a demonstration. We feel certain its performance will astound you.

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CBS 81171 £2.99

Laura Nyro Smile

Smile — now there's an unlikely title for a Laura Nyro album. But her fans need have no fear; she explores on this record, as before, the whole gamut of emotions from gloom to despair, with a little light relief in the shape of cynical resignation. The arrangements seem to owe more to Joni Mitchell than has been noticeable before, and they're very slickly played. To my ears Ms. Nyro is a humourless and uninspired artist, but those who have enjoyed her in the past should go for this. **TP**



Pye NSPH 18

Lena Martell Country Style

The approach is rather like "Country and West Country", the softness of countryside rather than the hardship of the West. And it works well with plenty of strings, a touch of sing-along vocals and just a hint of honky tonk and a glint of steel guitar. The clean sound and simple rhythms make this ideal summer music, music to sip cider by. When Lena sings *I'm Gonna Be A Country Girl* it's hard to believe the lady was ever anything else. **MS**



Arista ARTY 124

Terry Garthwaite Terry

Nothing any of the erstwhile members of Joy of Cooking

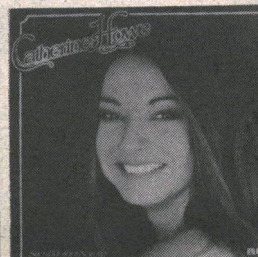
have done since the band broke up has equalled their three records together. But this is the best so far. There is the familiar stuff, wistful raunch (Janis Joplin meets *The Relationship*) and even two songs by Toni Brown, who wrote most of the JOC material. There are also differences — a dalliance with Western Swing a la Dan Hicks, some creditable pastiche of Billie Holiday. The biggest difference is the way it's done. JOC was light and springy. This is produced by Herbie Hancock's producer David Robinson, there are Herbie Hancock sidemen in the band, electronic devices and rotund bass guitar. Very much recommended; it's also not too late for EMI to do right by the Joy Of Cooking catalogue. **RB**



Capitol E-ST 11517

Natalie Cole Natalie

On her second album Nat King Cole's daughter sounds — and looks — totally stunning. The Chuck Jackson/Marvin Yancy songs and production highlight Ms Cole's bright vocal attack — there some delightful scat on *Mr Melody* — and provide her with some of the most infectious soul sounds ever to come out of America. On this showing Natalie seems set to pass Aretha Franklin in the soul-comes-of-age-and-goes-musically-respectable stakes. Nat would be proud of her. **MS**



RCA RS 1041 £2.99

Catherine Howe Silent Mother Nature

Catherine Howe has a strong voice and is learning her lessons well from the great black female singers. But she has not yet got complete control over her tone or pitch and sometimes runs out of speed towards the end of a

phrase. Some of her songs are beautiful, notably *It Took My Breath Away*, but some ramble a bit. In short, Catherine Howe will be very, very good someday, but isn't quite there yet. Meanwhile, this album is helped by some crisp production by Pip Williams and some brilliant playing by Paul Keogh (guitar), David Wintour (bass) and Mike Giles (drums). Good music, but with shades of inexperience. **TP**



Atlantic K50223

Nanette Workman Who Cares

The first song, *Who Cares*, sounds as if a soul singer had finally put back into singing what Miles Davis got when he cross-fertilised terminal New York bop with Sly Stone. It's violent, abrupt, random, and the singing is amazingly wild (as opposed to just aggressive), completely exterior. Bits of the rest of the record echo that, but mainly it's more straightforward. It's very hard edged — Ms Workman's usual singing voice is different but still tough — and the songs are all originals and have idiosyncracies enough to stay with you afterwards. It's well worth following up, but it promises even more exciting things to come. **RB**



Pye NSPL 18489

Marti Caine Nobody Does It Like Marti

Yes it is Marti Caine the red-headed comedienne who made you laugh on the small screen. And her singing voice is as bubbly and bright as her patter suggests; it comes on clear and strong, a Streisand without the stridency and Bassey without the over-enunciation. Numbers come tight and rhythmic like *The Drum*, romantic like *What I Did For Love* or soulfully serene like the medley of

Gladys Knight numbers. *Sour Love Song* must be the most "unromantic" number ever recorded. A comedienne who plays vocalist and wins. **MS**

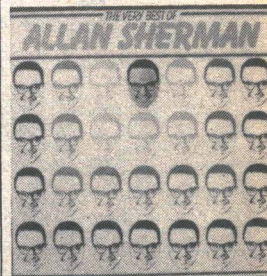
HUMOUR



One-Up 00 2121

Hinge & Bracket Vol 1

George Logan and Patrick Fyffe, alias Dr Evadne Hinge and Dame Hilda Bracket, offer music and memories as fey and as fringe as Edinburgh's Festival and London's Quaglin's will allow. Imagine it, a pair of musical cum theatrical gentlemen, dressed as very late Edwardian ladies who intersperse selections from Gilbert & Sullivan and Ivor Novello with recollections from their imagined touring days. They appear just a little too genteel to be called drag artists and a little too musical to be out and out jokers. Yet the apparent primness of their chatter fails to hide a certain bitchiness while the music trills with the true splendour of that professional amateurism beloved by the English. **MS**



Warner Bros K56056

Allan Sherman The Vest Best of

Mr Sherman has the rare talent of adding humorous lyrics to classic pops and popular classics. *Hello Mudduh*, *Hello Fudduh* (Ponchielli's *Dance Of The Hours*) is deservedly a family favourite and *Sarah Jackman* (Frere Jacques) and *Mexican Hat Dance* are almost as popular. Unfortunately, taken with nine other tracks the essentially nasal sounding and Jewish family based humour starts to pall a little. *Bye Byne Bumbert* (Blackbird) and *Second Hand Nose* (Rose) may be good but they're not that good. **MS**

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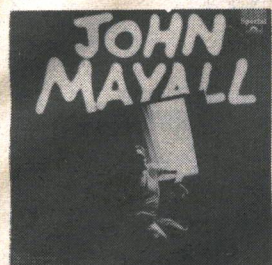
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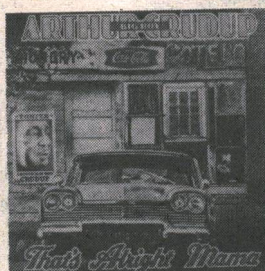
John Mayall

John Mayall's very special

talent has always been rather eclipsed by the success of his less purist sidemen, but this retrospective of his five years with Polydor presents him firmly in the spotlight. Only one track, *Accidental Suicide* (a ghastly song, incidentally) features any sort of super-guitar playing — from both M. Taylor and E. Clapton. Mostly it's just John wailing away and blowing some very neat harp, with modest but totally convincing rhythm back-up. Some of the numbers are a little short of ideas, but it's all superbly honest and individual music. *Don't Waste My Time*, from

Mayall's experimental no-drummer period, is outstanding.

TP

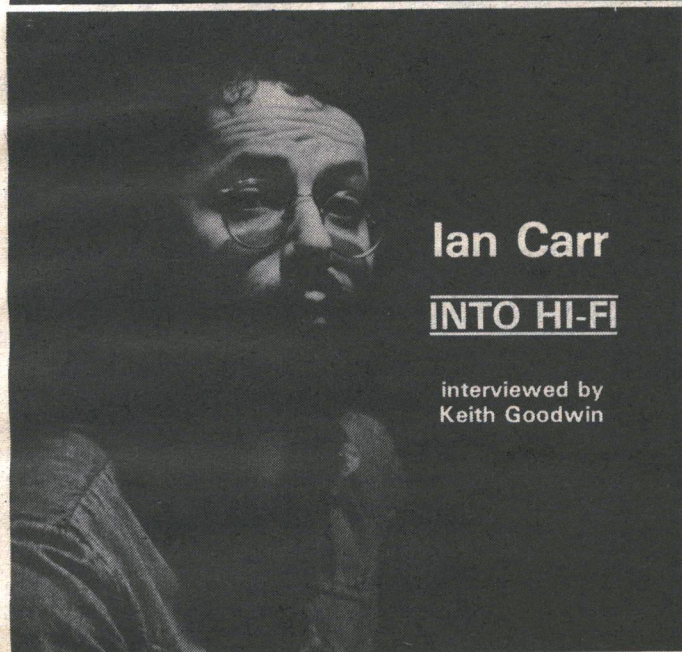


DJM DJS LM 2025 Mono
Arthur 'Big Boy' Crudup

That's Alright Mama

This is a beautiful, rough, valuable collection in 1959 when Crudup was 54. He'd already retired from playing; poor, disillusioned and fed up. Even then he had not received a cent in royalties from Elvis Presley's epoch-making version of *That's Alright Mama*. But these 12 tracks, half the product from a single all-night session, show him in sparkling form, singing and playing with real verve. Besides the title track, the highlights are *Greyhound* and the powerful *Mean Ol' Frisco*

(another song which caused confusion over royalties — it's credited to Crudup on the sleeve-notes here and to Lightnin' Hopkins on the record label). Crudup's guitar technique was always underrated — again the sleeve calls it 'somewhat limited'. But it was limited only in the way Keith Richard's playing is — limited to punching the songs along in the way they work best. The album is a genuine must for Blues freaks and anyone interested in the roots of Rock 'n' Roll. **IES**



Ian Carr

INTO HI-FI

interviewed by
Keith Goodwin

Ian Carr views the world of hi-fi with a mixture of joy and scepticism. As a practising musician — the trumpet-playing leader of *Nucleus* and one of the most gifted and consistently creative soloists on the British jazz and rock scene — he readily welcomes the clarity and added dimensions which advanced audio technology has brought to sound reproduction and, subsequently, audience appreciation. But he is also acutely aware that the massive technical strides which have made hi-fi one of the world's most progressive and forward-thinking industries have also — perhaps unwittingly — created a new breed of listener who is more conscious of (and interested in) the high quality performance of his equipment than the music being reproduced through it!

"Hi fi is a fascinating subject and it's easy to understand why people get hooked on it. But I believe that there's a very real danger that having scratched the surface, you can go over the top. What you have to remember is that hi-fi is in reality an aid to music appreciation. It adds dimension to music, but it can't take the place of it", says Carr.

"I had a really bad time a little while ago with a fellow who wanted to play me a particular record. He began by telling me exactly where to sit, then briefly outlined what I was going to hear from each speaker. Then he spent 10 minutes

cleaning the record. Even when the music was playing, he leapt up, stopped the turntable and cleaned the damned thing again because of some barely discernible click. That, to me, is when hi-fi starts to get out of hand.

"You see, little clicks and scratches and other minor imperfections in the sound reproduction just don't bother me that much. OK, so I hear them. But it doesn't really matter. The important thing is the music. A record has to be in a pretty bad state before the sound blemishes begin to destroy my concentration or my enjoyment. It's a question of music quality first, sound quality second.

"I'm quoting an extreme case — I realise that. But I still believe it's very easy to become obsessional about audio equipment, and it's a pitfall that I want to avoid", says Carr.

Like everybody else, Ian recalls modest beginnings when first confronted by the complex and often confusing world of domestic high fidelity.

"I started out with two small Sinclair speakers, a little Teleton amplifier and a Garrard SP25 deck. That was back in 1970, and the lot cost £58.00. I suppose it's pretty unsophisticated by today's standards, but it served my purpose more than adequately. I would have liked a bit more bass response from the speakers, but that was about the only

thing that bothered me", he recalls.

Right now, Carr is in the throes of putting together a new audio system, and spends as much as his free time as possible hearing current equipment. He's wavering between Dittons and KEFs when it comes to speakers, and also expresses enthusiasm for the Tannoy range. As far as a deck is concerned, his mind is pretty much set on Thorens, whilst on the subject of a cartridge, he's open to suggestion.

Three names crop up in the amp range — Sony, Trio and Pioneer. And if his budget runs to a cassette deck, it'll be Sony again — with a sideways look at the Teac equipment.

A reel-to-reel tape machine doesn't figure in his plans at all. "There's some fantastic machinery about — Revox and the four-track Teac are well up to professional recording studio standard. But they'd be a luxury, not a necessity. I suppose I could use an open-reel machine for writing purposes, so I haven't dismissed the idea completely".

Despite widespread predictions of a sound revolution in the home with the coming of quadraphonic amps, Carr is largely unimpressed by developments so far.

"I haven't heard too much quad in the home but the little I've heard has left me pretty cold. Perhaps the equipment was sub-standard, maybe it was set up badly. Whatever the reason, the sound seemed to be a bit too clinical, almost sterile. I was too conscious of the mechanics of the sound system.

"But in a car — well, that's a totally different matter. I have a quad system that I find remarkable. It's a Motorola 405, with a four-way balance controller. Because it's in a confined space, you get a fantastic sort of surround-sound. It kind of wraps itself around you. Unbelievable. But I've never experienced this same sort of excitement with quad in the home".

Quite surprisingly, Carr is largely unfamiliar with the use of stereo headphones for home use. "I don't own any cans, and I can't ever remember using them for home listening. Of course, we use them in the studio and on stage. But I've never really considered them as a method for listening to records at home. I know some people swear by them, and I've also heard arguments that they're the most anti-social device ever introduced by the audio industry. But they sell like mad, so there must be something to it".

Having cut eight albums with *Nucleus* — plus appearances on countless others — Carr talks with justifiable

authority about present-day recording studio equipment and techniques. "What with noise reduction systems, computer mixing and all the other refinements, recording has reached a peak of perfection that will be difficult to better. There's so much electronic wizardry at our disposal that it's quite frightening.

"And it's so easy for a musician to abuse these aids. What I mean is, some guys spend months and months recording, mixing and eventually producing a master tape that represents the ultimate in high fidelity sound. They hear the playbacks through huge great JBL speakers, and Dolby units are stacked all over the place so that tape hiss is virtually non-existent. And it's all bloody marvellous.

What they forget is that when 24-track master is reduced to two tracks, and then committed to a good old-fashioned record, it's going to be played on domestic equipment that simply doesn't hold a candle to the professional gear. I'm convinced that most people have pretty ordinary, not over-expensive equipment in their homes, so the original point of the exercise tends to go by the board.

I'm not suggesting that musicians shouldn't strive for the best possible sound reproduction, or ignore the possibilities of added effects offered by stereo mixing. But I do think they should always bear in mind that the average domestic hi-fi system can rarely do justice to their efforts.

Nucleus always complete the mix-down by playing the material back through a very ordinary audio system. Only then will we give the recorded material the final OK. I'm not trying to give myself a pat on the back — it's simply that I believe it's imperative to remember who the music is aimed at in the first place . . . the listener", says Carr.

Over the years, Carr has put together an extensive record collection ranging from early jazz to electric rock and all stops in between. Music is his life — an all-consuming passion. And although critical about some of the obsessional aspects of hi-fi, he continues to keep a watchful eye on developments.

"Any invention or refinement that aids the enjoyment of recorded music is more than welcome. I'd be totally lost without a record player. It means, quite simply, that in the privacy of my own home, I can experience the whole range of human emotions that music can produce. For that, I owe a great debt of gratitude to Mr. Thomas Edison!"

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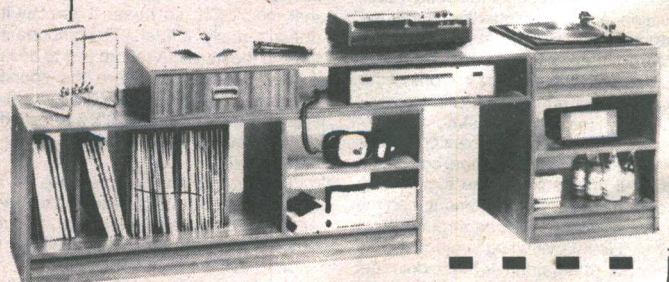
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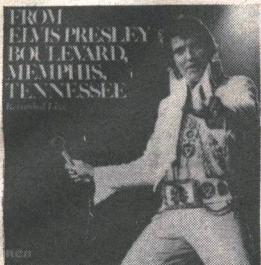
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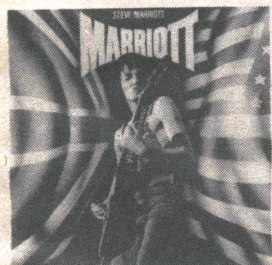
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RCA RS 1060 (APLI 1506)

Elvis Presley From Elvis Presley Boulevard, Memphis, Tennessee

In the days when Elvis was the greatest white pop singer in the world, he always gave the impression that however much he shouted, hiccupped, grunted and emoted, there was always something left over. Today he gives all he's got, and a little bit more, and it's still not enough. It's not pleasant to have to say it, but the weakest thing about this record is the ex-king's voice. The choice of songs is reasonable considering the audience El has to aim at nowadays, and in spite of some examples of grotesque over-orchestration, the arrangements are generally well conceived and played. One or two tracks, notably *The Heart*, nearly make it as MOR rock. But that once-astounding voice has lost its power, the intonation is faulty and the breath control lamentable. Very sad. TP



A & M AMLH 64572 £2.99

Steve Marriott Marriott

I must admit to a recurrent fantasy about Steve Marriott. I have this dream about him suddenly reverting to a weedy, fallow, rather unmusical youth with a big grin and a bunch of crude, catchy and unstoppable hit singles, just like the old days. It's unfair, I know, but I compare everything subconsciously with *Whatcha Gonna Do About It*, *Itchycoo Park* and *Lazy Sunday Afternoon*. This solo set was probably dedicated, in career terms, to helping him get going again after the break-up of Humble Pie. It splits into two sides, one American, one British, but both characterised by a slightly dulled professionalism — a lack of

the exuberance and exhibitionism we might have hoped for, given that he had only himself to please. On the whole, the American tracks generate a bit more tension, but only *Star In My Life* stands out — and that's not a patch on what Stevie can do. IES



RCA RS 1055

David Bowie Changes

Words merge to form this album's title and titles merge to make it a feast of unpunctuated hits. In the Sixties it was the fashionable feyness of *Space Oddity* and by the Seventies it's the throb of funk and *Fame*. All the *Changes* are rungs in a ladder of popular sound and always one step ahead of their contemporaries. David Bowie's greatest hits is a *Jean Genie* genius of an album. MS



Bearsville K55510

Todd Rundgren Faithful

Faithful is as faithful does. Side One of this extraordinary album consists of exact, minutely detailed replicas of six of the great rock recordings of our time: Dylan's *Most Likely You'll Go Your Way And I'll Go Mine*, the Yardbirds' *Happenings Ten Years Time Ago*, *Good Vibrations*, *If Six Was Nine* and two Beatles classics. There is no attempt at reinterpretation. The only thing which limits the meticulous accuracy of the cover versions is Rundgren's relative lack of talent as a vocal mimic. Draft in Mike Yarwood as lead singer and you would have the ultimate in musical decadence, Xerox Rock. *Strawberry Fields* even retains that weird, enigmatic drums-and-flutes coda and there again is the reversed vocal track on the last part of

Rain. Close study of these six tracks should reveal almost every lesson the budding songwriter ever needs to learn about how to make pop music work. Side Two consists of Rundgren's own compositions. If he had learnt those lessons of melody, harmony, economy and gimmickry, it would be great. But he's not faithful to these guiding lights — and that's perfidy. IES



Philips International 6336 245

Jerry Lee Lewis Golden Hits

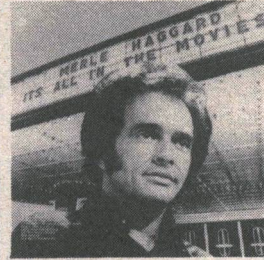
Mid-price compilation of Jerry's original Sun hits re-recorded after he transferred to Mercury/Smash in '63. While the titles are classics these versions of *Whole Lotta Shakin'*, *Great Balls Of Fire*, *Breathless* and *High School Confidential* just don't have the same fire as the Sun sides. Lewis's original recordings are newly reissued on the Charly label. MS



Chrysalis CHR 1110

Karlheinz Stockhausen Ceylon/Bird Of Passage

Stockhausen, says the liners, went into a temple in Ceylon which he was passing through. He heard some authentic Singhalese music being played and was so impressed that he stayed for more than an hour. Then he went back to his hotel room and penned side one. The result is, as you'd expect, tourist music, spuriously exotic and with irritating native drumming from the composer. *Bird Of Passage* is much more impressive, has some furious piano and layers of raw trumpet. Strong stuff, which sounds like a rough print of something by Cecil Taylor. RB



Capitol E-ST 11483 £2.99

Merle Haggard and the Strangers It's All In The Movies

Country musicians don't make concept albums. This is just eleven songs, half by Haggard himself, and his photo on the front and back of the sleeve. The emotional range stretches for the most part from querulous down to gloomy; Haggard, as he has admitted in so many words, is no believer in the cosmic giggle. He sings with conviction and his band get solos. Some of the songs could have done with a bit more rehearsal. It's just another Merle Haggard record I suppose. RB



Polydor Super 2383 392

Mike Berry Rock's In My Head

Joe Meek lives — this is the Holloway Road Sound updated by one of its first stars who's still sounding like Buddy Holly and still singing his songs. There's *Peggy Sue*, *That'll Be The Day*, *Rave On*, *Think It Over* and *I'm Gonna Love You Too*. He's backed by Meek's original Outlaws and if the arrangements have changed and the recording techniques improved there's still enough to stir Sixties memories. There's a lot of echo, vocal hiccups and — best of all — a reworking of Berry's hit *Tribute to Buddy Holly*. Rave on! MS

Polydor Super 2383 399

Neil Sedaka Laughter & Tears

Subtitles 'The Best of Neil Sedaka Today' and covering the period '74 to '76 this 18 track compilation is a revelation. While remembering *Laughter In The Rain* it's easy to forget that Sedaka wrote *Solitaire* (Andy Williams/Carpenters), *Love*

Will Keep Us Together (Captain & Tennille), and — from his first hit period — *Breaking Up Is Hard To Do*.

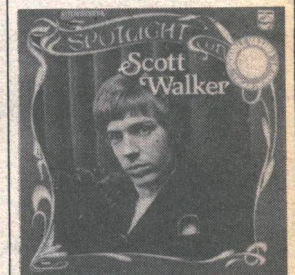
The approach may have mellowed but the talent and style have grown and with them the audience. You may remember Sedaka as a rocker but it's worth rediscovering him as a writer. MS



Warner Bros K56210

Ray Stevens Just For The Record


None of the chirpy, gimmicky novelty numbers here which have given Ray Stevens his modest handful of chart singles. *Bridget The Midget* is obviously dead and buried. And her progenitor has settle himself into a more conventional vein. This album consists of middle of the road pop, sung in a pleasant countryish way and recorded in Nashville. It's more than competently done — and Warner Brothers, obviously recognising something saleable when they see it, even got Ed Thrasher, their main art director, to take the soulful sleeve photo himself. RB



Philips International 6625 017

Spotlight on Scott Walker

The blue-eyed soul man who discovered Jacques Brel songs and lived happily ever after — until the Walker Brothers made a comeback — is in fine dramatic form on this double album of past hit singles and album tracks. The production is often of Spector-like proportions although the orchestrations aren't quite up to such Walker Brother classics as *The Sun Ain't Gonna Shine Any More*. Best tracks are *Joanna*, *Lights of Cincinnati* and Brel's *Jackie and Mathilde*. A welcome reissue. MS



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Distributed by BSR Ltd., Powke Lane,
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RECORDS TO BUY POPULAR

COLLECTIONS

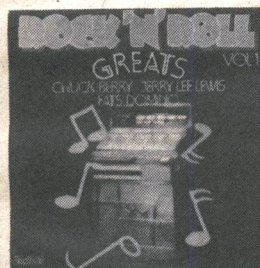


Philips International 6426 023

Rhythm and Blues Party

On with the drapes, drains and memories — this is sax appeal Fifties style with Sil Austin and Red Prysock plus Louis Jordan, Ray Charles, Little Richard and Ruth Brown. The saxophone has never sounded ruder or more raucous than on *Shufflin' Home* and *2 Point 8* while voices don't cut much rougher than Clyde McPhatter's *Rockin' Robin* or Ruth Brown's *Jim Dandy*. The album was originally issued '63 and the mono recordings ensure complete authenticity. Clive Richardson's sleeve notes offer a useful guide to the uninitiated.

MS



Contour CN 2014 £1.00

Rock 'n' Roll Greats, Vol. 1

The greats are Chuck Berry, Jerry Lee Lewis and Fats Domino playing such hits as *Sweet Little Sixteen*, *Great Balls Of Fire* and *Blueberry Hill*. Rock 'n' Roll and its stars rarely come bigger, brasher and gutsier than this trio of enfants terribles and if the tracks don't sound quite like the original hit single versions they pound along in true rip roarin', keyboard-killin' and guitar-lickin' performances.

MS



London DREAM-R-56

Various Artists

The American Dream, The London American Legend — Part 2

This is the third, and finest, of Decca's London label instrumentals, doo wop and rock-a-teen ballads. The selection is a veritable vinyl feast of yesteryear's singles charts from '57 to '64 and includes classics like Duane Eddy's *Rebel Rouser*, The Champs' *Tequila*, Ritchie Valens' *La Bamba*, the Hollywood Argyles' *Alley-Oop* and little Anthony And The Imperials' *Tears On My Pillow*. For rock dream lovers everywhere.

MS



Brunswick BRLS 3019

Brunswick: The Strongest Sound Around

Sound sampler from New York's Brunswick label, charts the company's progress from '70 to '75. The stars are the Chi-Lites, Hamilton Bohannon, Willie Henderson and — surprising for many — jazz man Lionel Hampton. As the relative lack of Jackie Wilson tracks proves (he's only featured on *Don't Burn No Bridges* with the Chi-Lites) this isn't Brunswick's *Greatest Hits*. That's available on BRLS 3006. But, as the title says, they're the strongest sounds of Brunswick — sort of meaty, beaty big and black.

MS



Polydor Special 2482 323

Super Hits of the Seventies Part I

Multi-music type repackaging of some of Polydor's recent hit singles resulting in an album of contrasts. There's the soul of Joe Simon's *Step by Step* and *Drowning In A Sea Of Love*, the reggae of Bobby Bloom's *Montego Bay*, the rock of the Rubettes'

Sugar Baby Love and Slades' *Take Me Back 'Ome* and the softer sounds of the New Seekers and the Kissoons. Fourteen tracks on a mid price album spells value and the programme guarantees a family of favourites.

MS

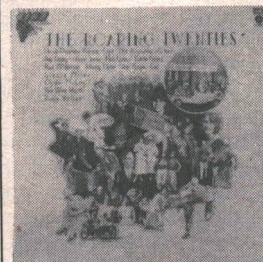


Phil Spector International Super 2307 007

Phil Spector Wall of Sound Vol 4 Yesterday's Hits Today

Back to mono for a combination of Spector's greatest hits with the Ronettes, Crystals and Darlene Love plus rarities from the same and the Alley Cats (*Pudding 'n' Tain*). With only five tracks duplicated elsewhere in the Wall of Sound series the album is a must for Spector fans and a continual reminder that a decade after the Philles label there's no one to match the master at the production console. Little symphonies for the kiddies — of all ages.

MS



Capital Vine VMP 1022

The Roaring Twenties

Delightful compilation of 40s (?), 50s and 60s cuts from the Capitol archives featuring big names and wacky music. There's Frances Faye wishing she could shimmy like Sister Kate; the Andrews Sisters warning *Keep Your Skirts Down Mary Ann*; and Eddie Cantor asking *Josephine Please No Lean On The Bell*. Rudy Vallee, Joe 'Fingers' Carr, Paul Whiteman and the late Johnny Mercer — one of Capitol's founders — are in there too. *It Had To Be You* by Isham Jones and his orchestra featuring Curt Massey on vocals catches the current nostalgia boom well enough to make a hit single.

MS



Super Beeb Belp 007

Reggae Time

Billed as "16 Great Reggae Hits from BBC Radio London's Reggae Time", this collection creams the Trojan and other catalogues, to bring you *Big Youth (Wolf in Sheep's Clothing)*, Totts The Maytels (*In the Dark*), Desmond Dekker (*Sing A Little Song*), Bruce Ruffin (*One Big Happy Family*) and others in cuts which have kept "Reggae Time" on top as Britain's first reggae on radio show. Good introduction for those seeking the delights of Jamaica's contribution to the current musical scene.

MS



Philips 6300 201

Turn On A Party

A monster party album of 20 of Phonogram's biggest chart hits covering the rock, soul and pop fields in recordings from the Mercury, Vertigo, All Platinum and Philips labels. 10cc open and close proceedings with *Life Is A Minestrone* and *I'm Not In Love*, in between there's the Moments' *Girls*, Alex Harvey's *Dellah*, 5000 Volts' *I'm On Fire*, the Stylistics' *You Make Me Feel Brand New* and Rod Stewarts' *Maggie May*. Don't forget to invite the neighbours.

MS

BANDS

Manticore K53508

P.F.M.

Chocolate Kings
P.F.M. are Italian and sing ambitious songs in broken English. Sometimes they sound startlingly like middle period Family, not just the throaty singing, but the way they use violin and the brusque way their songs progress. There are also signs of having listened to

Billy Cobham; there's his style of eight-to-the-bar drumming. There's plenty to admire, in fact, because they're not mere copyists and it's all very competent. It's quite hard to warn to them though, and you could find records that are wilder, faster and more literate, and have soul too.

RB



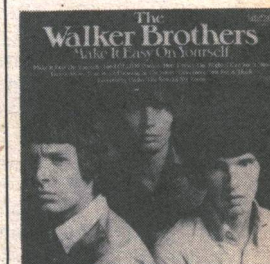
A & M AMLH 68377 £2.99

Budgie

If I Were Britannia I'd Waive The Rules

Fifth album from the Welsh three-piece, and it is a good one. Their imaginative approach to rhythm never obscures the authenticity of the band's commitment to basic rock 'n' roll, and they play just fine. The singing isn't great, and it would be nice to hear more extensive use of vocal harmonies, but nothing is perfect in this world. Budgie deserve to make some money from this album, and it certainly provides good reason for wanting to catch them at a live gig.

TP



Contour CN 2017

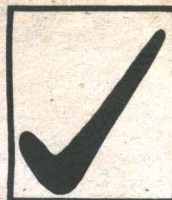
Walker Brothers Make It Easy On Yourself

This moody looking trio of Americans who found fame as Britain's answer to the blue-eyed soul of the brothers Righteous remains unsurpassed in the slow build drama of symphonic ballads. Ten years since they asked you to *Make It Easy On Yourself* this collection has lost none of its impact. Soul has rarely been bluer-eyed than on their performances of *Dancing In The Street* and *Land of 1000 Dances* and the group's recent return to the hit parade with *No Regrets* makes this a particularly timely release.

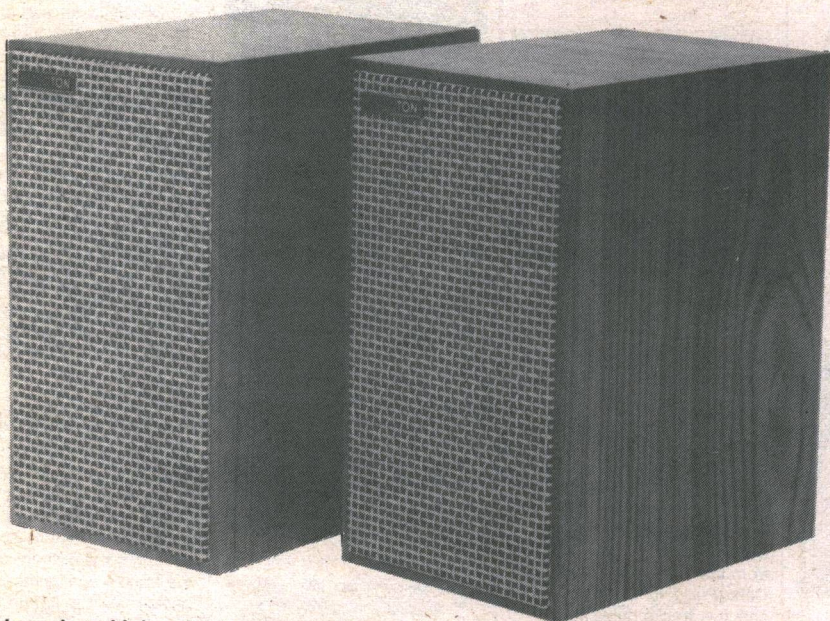
MS

A REVIEW TO BE PROUD OF!

RECOMMENDED
SYSTEM



HI FI ANSWERS REVIEW
PRINTED VERBATIM.



Mini speaker with knockout sound—Videotone Minimax 2

Videotone Minimax

As you will have gathered, the very small Minimax speaker which measures 10½in high, 6in wide and 9in deep attracted all the attention in this month's recommended system. Apparently, Videotone are a very large Hungarian manufacturer of loudspeakers, and, pardon our ignorance, but our limited vision confined to the western world, made us unaware that such activities (slightly decadent you must admit) prevailed on any large scale in the Communist bloc. Our surprise is not caused by this fact, but simply by the unbelievable performance offered by such a small unit at such a low price. The Minimax must certainly be far ahead of any competitors at a price level of only £44 per pair, but the performance may be considered good in absolute terms without reference to their retail price.

Within each solidly made cabinet lie two drive units, a bass/mid-range unit with a 5in cone diameter and a compliant roll surround that gives it a long throw, and a 3in treble unit. Both have paper cones and are sturdily made. These speakers were assessed critically by A-B comparison with high quality reference units

over a period of time and using, initially, a top quality amplifier. The treble was clean and well maintained, but the mid-range was of very high quality with a smoothness that gave the impression that this characteristic had been given precedence over detail, but this proved not to be the case. The detail provided was of a very high order and whereas almost all small speakers suffer from a constricted sound and sometimes tendency towards a nasalness, the little Minimax 2's sounded both large and open in a manner we have not encountered before on any speaker of such low pretension (and dimension!).

The above qualities can be engineered into a small speaker at a price (although in practice this situation is rarely met), but without doubt it is the bass content of the reproduced signal that normally suffers to the greatest extent with small cabinets. Again, the Minimax manages inordinately well and during straight-forward listening there appears to be little absence of signal in this frequency region. Even the largest percussion instruments manage to achieve that thunderous quality that is usually killed

by a small speaker. Obviously, there is a lack of very deep bass, but we note that turning the bass control up on a 40watt per channel amplifier running close to full output restores this deficiency to some extent without the Minimax showing any signs of distress! This is the point when astounded listeners laugh in amazement, for with the speaker perched on top of sizeable monitors and in a large room shaking to the lifelike reproduction of a full orchestra, you can't quite believe your ears! Connected to the Amstrad 5000 healthy levels could be achieved in medium sized rooms and the Minimax added the most worthy finishing touch to our inexpensive system. The key points of this system were the speakers and the cartridge. They are normally to be considered the weakest links at budget price levels, but the extra expense of the Stanton does reap large benefits, and the speakers—well they are hi-fi gems.

'Good' turned out to be hardly an appropriate word—'astounding' might be more apt! The speakers gave our final system a real boost in quality for at these price levels it is normally accepted that they will be the weakest link in the chain by a large margin—but not so in this instance.

Their modest appearance and price disguise their startling abilities. Never have we heard such a small speaker sound so big! Nor so good. With a recommended retail price of £49.50 per pair including VAT the Minimax 2 is this year's bargain speaker. People who heard them couldn't quite believe that such a large performance came from such diminutive boxes and laughed with astonishment.

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RECORDS TO BUY POPULAR

ORCHESTRAL



Music For Pleasure MFP 50258

Billy Vaughn Best Of...

Cast your ears back to those legendary days when the London-American label ruled the hit parade and you're bound to remember Mr Vaughn and his orchestra. He backed Gale Storm, Pat Boone, the Fontaine Sisters and recorded his own raunchy, often sax-dominated instrumentals like *Sail Along Silvery Moon*, *Melody Of Love* and *Wheels*. This set adds 13 more to that hit trio and includes such monsters as *Orange Blossom Special* and *Swingin' Safari*. Rock at its orchestral best and orchestrals at their most romantic.

MS



CBS 22023 £2.99

The Best of The Glenn Miller Orchestra

(Vols. 1 and 2)
A timely and attractive two-for-the-price-of-one package from the "official" Glenn Miller Orchestra, now run by clarinetist Buddy De Franco. Despite the passage of time, the orchestra here is still roughly a 50/50 mix of hall-marked Miller veterans and younger players. The canon is handled with an energetic but respectful verve, manifesting both the strengths and weaknesses of Miller's rigorous approach to voicing for the most tightly-drilled band in the world. As with the original recordings, the basic trick of carrying the melodies on tenor sax and clarinet an octave apart against banked-up harmonies from the other saxes produces a splendidly monumental sound, though, as always, *Little Brown Jug* and even *American Patrol* betray the

triteness lurking just below the surface. Compare them with the consistently under-rated arrangement of *Rhapsody In Blue*, and wonder at the way history has always warped our view of Glenn Miller's achievement.

IES

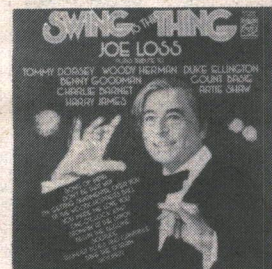


DJM DJSML 2023

Button Down Brass Firedog!

This is the Button Down Brass "punching" its way through a dozen muscular TV detective themes with the "funky" trumpet of Mr Roy Davies. The results leave one exhilarated and rather breathless as McCloud, Kojak, The Sweeney, Columbo, Hawaii 5-0 and Firedog build up the excitement with the biggest beat most detective fans will have experienced since Dixon walked Dock Green.

MS

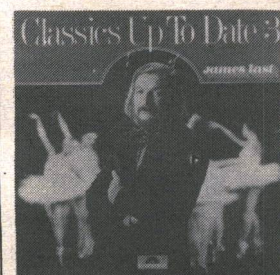


Music For Pleasure MFP 50300

Joe Loss Swing Is The Thing

This is Mr Loss with lots of gloss playing swinging tributes to Basil, Ellington, Goodman, Herman and other big band leaders in an album recorded in '70. Wally Ridley was producer and numbers include *Skyliner*, *Take The A Train*, *One-O-Clock Jump*, *Begin The Beguine* plus eight other big sounding selections. Just the swing.

MS



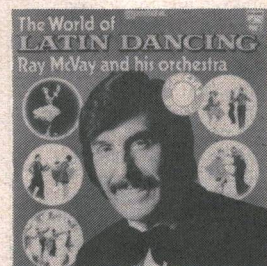
Polydor Super 2371538

James Last Classics Up To Date

When James Last turns to the

classics, they get the same wallpaper treatment as other styles. Bland they may be, but they are superbly played by a bunch of top light musicians. These selections will never satisfy the classic buff, but thousands who constantly hum snatches of familiar melodies will be absolutely delighted, included are *Traumerel*, *Leibestraum*, *Marche Slave*, *La Mattinata*, and *Fantaisie - Impromptu In C Sharp Minor Op. 66*. Hearing *Liebstraum* with a shuffling beat is something else.

JH

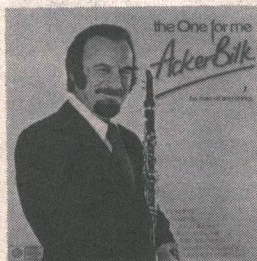


Philips Instrumental 6641 306

Ray McVay World Of Latin Dancing

Ray — and his orchestra — offer strict tempo Latin dance sounds on this double album with a side apiece of cha chas, rumbas, sambas and pasa dobles and something referred to as "pops, jive and rock". The sleeve gives the bars per minute for each dance; credits Bonfa/Peretti/Createone/Weiss as writing a rumba called *Schubert's Serenade*; and shows couples in *Come Dancing* clinches. Music that it's impossible not to dance to.

MS



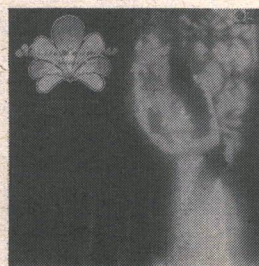
Pye NSPLX 41052

Acker Bilk The One For Me

Acker, his trusty clarinet and faithful strings to hand, is in soft reflective mood on this collection of pop classics and recent musical offerings — like *Send In The Clowns* — recorded in QS 4-channel stereo. The clarinet blends rather than solos although the vocals on *They Can't Take That Away From Me* show that Acker's trusty voice is the one constant in the new no-jazz approach. It's worth

remembering that the classic *Stranger On The Shore* has just been reissued by EMI as a single.

MS



Pye NSPLX 41051

Norrie Paramour Orchestra Pictures

A lushly romantic offering of popularised classics like *Mozart 40* and *Theme From Guitar Concerto De Aranjuez* blended with the classic "pop" of *Moonlight Serenade* and *Sweet And Lovely* to produce one of the easiest to listen to albums in months. The recording — in QS 4-channel/stereo — is exemplary and the arrangements as smooth as silk.

MS

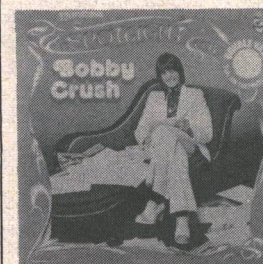


CBS 81440

Caravelli Rockin' Strings

Glossy and very stylish album from CBS France featuring the strings, percussion and saxophones of Caravelli in big sounding and heavily rhythmic arrangements of recent soul and rock hits. *Love To Love You Baby*, *When Will I See You Again* and *The Hustle* have rarely sounded more symphonic and glamorous. It's like a mid-Seventies Ray Conniff with less emphasis on the voices and more on the violins — and all played with a French accent.

MS

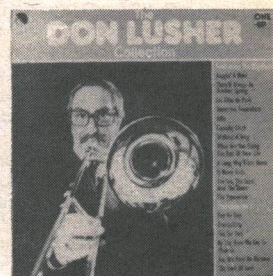


Philips International 6625 018

Spotlight on Bobby Crush

A two-for-the-price-of-one double album of over 60 pub-pop-piano favourites guaranteed to have you syncoated by the end of side one. Bobby Crush — Mr Beau Jangles — produces infectious good time sounds which merge with most situations. There are Tom Jones, Charles Aznavour and Osmonds medleys and keyboard classics like *Side Saddle* and *Alley Cat*. Only thing missing is the sound of tinkling glasses.

MS



One - Up OU 2129

The Don Lusher Collection

Tap a toe and lend an ear — this is the veteran Squadronaires and Ted Heath trombonist playing hot, cool and all temperatures between with his quartet and big band. The music is Swingtime, the programme varies through *Day By Day* and *Allie to Leroy Anderson's The Typewriter* and the line ups include Alan Branscombe, Duncan Lamont and Kenny Baker. Mamma will certainly allow trombone playing as witty as this.

MS



Philips De Luxe 9109 209

Syd Lawrence Swing's Greatest Hits '76

These are swing's hits recreated and modernised to catch the mood which recently introduced *In The Mood* and *Tuxedo Junction* to yet another new generation. While Syd Lawrence is more than capable of catching the spirit of swingtime with *Pennsylvania 6-500* and *Opus One* the performances lack the authenticity of Miller's mono sound or the camp of Manhattan Transfer's vocal interpretations. Definitely for the younger generation of jitterbuggers.

MS

RECORDS TO BUY POPULAR

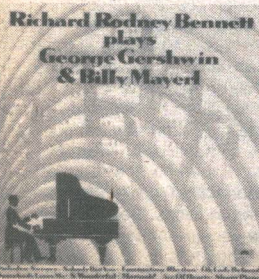


The great popular composers

Whatever changes occur in day-to-day popular music, the songs which endure are those created by the master craftsmen of each generation. Top artists still select their repertoire from the hundreds of songs by that selected handful of writers who laid the foundations for show business as it is today. Gershwin, Kern, Porter, Youmans, Hart and Hammerstein are gone, but many are still with us, among them, incredibly enough, 88 year old Irving Berlin who wrote his first song in 1907. Richard Rodgers, at 73, has fought back after a cancer operation, while Arthur Schwartz came to London last year, at 75, to record an album of his own songs with Tony Osborne's orchestra, *From The Pen Of Arthur Schwartz* (RCA1029). Ex-school teacher, lawyer, film producer and scenarist as well as talented composer, Mr Schwartz was never a professional singer. That this is self-evident doesn't detract from a charming if unskilled performance which apart from its documentary value retains the basic quality of such evergreens as *Dancing In The Dark*, *Alone Together*, *That's Entertainment* and *By Myself*. Harold Arlen, by common consent No. 1 outside the Big Five, is still around if not as prolific as in the 30s and 40s when he wrote the songs in Ella Fitzgerald's *Harold Arlen Song Book* (Verve 2683064). The 1961 double album now reissued was reviewed in May, but it does no harm to emphasise such an immaculate combination of composer, singer and arranger (Billy May). Shelley Manne's *Hot Coles* (RCA SF8454), a jazz tribute to Cole Porter, uses *Easy To Love*, *Get Out Of Town*, *Night & Day* etc as a soon-forgotten basis for jax-rock improvisations. The rhythm team is tremendously effective with good piano, vibes and guitar solos, but the two horns are a sad letdown in this inspiring context. The great George Gershwin was more than just an enthusiastic amateur as a pianist, possessing a highly technical syncopated style. In 1932 he arranged 18 of his best known songs for publication in *The George Gershwin Song Book*, a folio seldom recorded, requiring an interpreter possessed of both fear-some technique and a sound rhythmic sense. Richard Rodney Bennett is such a musician, and his interpretations on Polydor 2460245 are worthy of Gershwin himself. The short duration of these solos allows for the inclusion of 8 pieces by Billy Mayerl, renowned for trivial light music, but now seen to be a quite profound writer whose music still stands up today.

Though hardly a veteran, Michel Legrand's screen music of recent years rates him as one of the best modern writers, whose themes will surely prove as durable as those of the older masters. His *Windmills Of Your Mind* (MFP 50240) includes his own concert arrangements of *Summer of '42*, *Brian's Song*, *Picasso Summer*, *What Are You Doing...* etc, and the title tune, and at £1.25 there isn't a better bargain anywhere. So many songwriters were lucky enough to have two of the greatest contemporary singers put the seal of approval on their songs, a dozen of which are heard in orchestral settings by Robert Farnon and his Orchestra in *Sketches of Tony Bennett & Frank Sinatra* (Pye NSPL41048). There were three orchestras actually, strings, big band, and both combined in full-blooded orchestral style, with more jazz writing and solos than usual in Farnon albums. The superb musicianship involved, a sensitivity of approach on ballads allied with sheet vitality on up-tempo scores, makes this an album that must certainly be counted among the year's best.

ARTHUR JACKSON



SOUL



London SHU 8494 \$2.75

Syl Johnson Total Explosion

On a previous occasion we remarked that Syl Johnson made magnificent records that deserved to be more widely known, and that the inevitable comparison with Al Green (same label, band and producer) was not necessarily to the detriment of the less famous Memphis luminary. With the collapse of Stax records and the slight fall from favour of Al Green, Syl Johnson now seems the leading contender for the I Remember Otis Redding Championship. No endless funk, no disco mixes, no philly ethereality - this is sweet soul music of the sort that Arthur Conely once apostrophised, the real successor to Sam and Dave, Eddie Floyd and Wilson Pickett. Perhaps it is a sign of old age to prefer the Memphis horns to the Philly flatulence, but to one reviewer, at any rate, this is the most exciting LP of the year so far.

RC

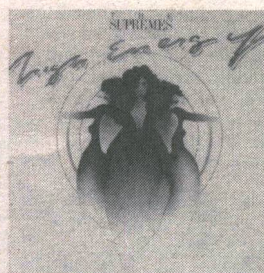


RCA Starcall DNY 0001

Original RCA Swing Sounds

A mid-price mono double album of Miller, Goodman, Shaw, Tommy Dorsey, Basie, Ellington, Charlie Barnet et al with many tracks taken from RCA France's legendary jazz catalogue. Most bands are represented by their best known numbers like *Pennsylvania 6-5000*, *Take The A Train*, *Cherokee*, and *And The Angels*. Label dates - but surely not original recording dates - are mainly given as the early seventies but whenever the recordings were made they swing for real and like crazy.

MS

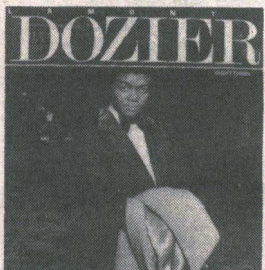


Tamla Motown STML 12027

Supremes High Energy

This is the return of the Magnificent Six - the Supremes and producers Holland-Dozier-Holland - in a long track, big sounding album of star quality soul. The beat, bite and breathiness build slower, surer and more seductively than the dozen-singles-make-one-album outlook of the old Supremes. This is seven magnificent tracks made as only Motown knows how. *I'm Gonna Let My Heart Do The Walking* peaks as the best Supremes number in years.

MS

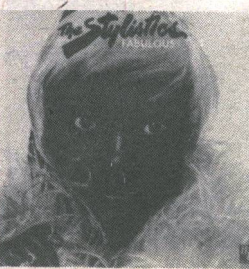


Warner Bros K56225

Lamont Dozier Right There

A breathy offering from the man who's still most famed for his Tamla days as a writer with the Hollands. His bouncy version of *It's The Same Old Song* is no comparison with the Four Top's original while the softer approach of numbers like *Jump Right On In* drifts into a disappointing sameness. Although all the numbers are self-penned and make for gentle, relaxing soul ballads it's sad the fire of his earlier work remains unkindled.

MS



H & L Records De-Luxe 9109 008

Stylistics Fabulous

Fabulously successful and

fabulously produced by Hugo and Luigi who deliver hook lines as memorable as pocket calculators. Songs like *Can't Help Falling In Love* lodge in the memory bank with a constancy that's difficult to ignore. The rhythms are bouncy, the orchestrations slightly strident and the vocals super energised. Van McCoy and Horace Ott share the credit for arrangements on one of the hardest selling soft soul albums you're likely to hear.

MS



Tamla Motown STML 12025

Marvin Gaye I Want You

Gentle, throbbing and totally masterful album from Marvin Gaye whose effortless ease hides one of the greatest arts in soul music. The voice is as graceful as the purr of a big cat but the music stalks as dangerously as a predator, ready to catch those fat on a diet of convenience music. The title track, as a vocal and instrumental jam, is stunning while the instrumental *I Want The Dance* is pure joy. *I Want You* is the nearest you'll get to a faultless soul album.

MS

JAZZ



Sonet SNTF 692

The Bop Session

When Dizzy Gillespie, Sonny Stitt, Max Roach, Percy Heath, John Lewis and Hank Jones first played together in the '40s they created vibrant new sounds; hard, fierce, angular, often strident but always exciting. Therefore they all took a risk in May 1975 when they recreated their music for this album. But it worked, by heavens, it worked. The only adjective you can't apply is new. It's still vibrant, fierce and exceedingly exciting.

JH

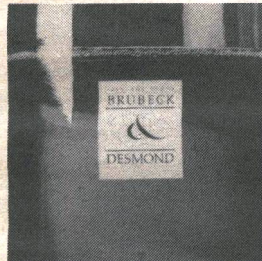
RECORDS TO BUY POPULAR



DJM DJSLM 2302

Clark Terry/Cecil Payne Cool Blues

What a lovely bop record this is. Made way back in 1961 it featured some of the cream playing the kind of music they grew up with, with incredible skill and technique, enthusiasm and love. Clark Terry, Cecil Payne, Duke Jordan, Ron Carter and Charlie Persip — some of them now names in the past — were at their peak here, each man was a master of his instrument, each complementing the other. Listen to *Shaw Nuff* and *Relaxin' At Camanilo* and *The Hymn* — so nice, nice old fashioned bop. JH



A & M SP 703

Brubeck & Desmond 1975 The Duets

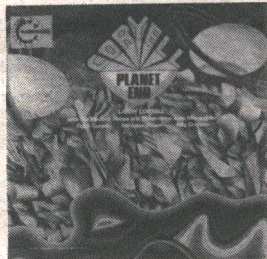
Despite expressed criticism over many years, pianist Dave Brubeck and alto saxophonist Paul Desmond carved out a jazz niche for themselves and attracted a larger following among record buyers than most small combos. The series of duets here came from an idea on board the S.S. Rotterdam last year when they took a working holiday. Desmond's linear approach is as attractive as ever and Brubeck, though offering some excellent back-up piano, sound as uninspired as ever when out on his own. JH



Capitol VineVMP 1023

Cannonball Adderley Cannonball

Altoist and soprano saxophonist Julian Adderley was one of that small band of jazzmen who became major stars without diluting their music. Cannonball and his cornet playing brother Nat, also a superb musician, appealed to a wide audience thanks to a funky rhythm section, featuring the great piano playing of Joe Zawinul, and to the brother's audience rapport. Their jazz has always been happy, always alive. These tracks recorded between 1960 and 1969 are a fitting tribute to the artistry of Cannonball, who died suddenly last August, aged 46. JH



Vanguard VSD 79367 £2.75

Larry Coryell Planet End

At first glance this appears to be a barrel-scraping album to celebrate Coryell's departure to Arista: two Eleventh House tracks, one of Coryell's overdubbed guitar playing and two from a studio band including McLaughlin, Corea, Miroslav Vitous and Billy Cobham as well as Coryell himself. The Eleventh House tracks are flashy and fairly ordinary, but the album lifts itself well above the bottom of the barrel with the songs from the other band. Due largely to Vitous' acoustic bass, these are elastic and mobile, the human end of jazz-rock. On *Tyrone* particularly there are some nicely edgy exchanges between Coryell, a pleasantly unmonolithic McLaughlin and a pleasantly untwee Corea. If you buy records by any of these three you should consider this one. RB



RCA RS 1031

Cleo Laine Born On A Friday

George Martin, of Beatles

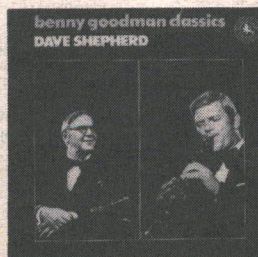
fame, produced ten of the eleven tracks on this album and made a fine job of it. Cleo Laine and husband John Dankworth have always been artists to keep abreast of changing styles and this album is an object lesson in how to present the female voice in a contemporary setting. In the line-up of backing musicians are such current stars as Max Middleton, Daryl Runswick and Christ Spedding. Cleo demonstrates that remarkable range, sings pretty songs (including *Streets of London*) and turns in one of her best ever performances on record. JH



Prestige PR 24051

Jam Session in Swingsville

This rather fanciful title is simply a neat way to package sessions featuring many of the giants of mainstream jazz onto a double album. The giants include Joe Newman, J. C. Higginbotham, Jimmy Hamilton, Buddy Tate, Coleman Hawkins, Pee Wee Russell and others. The sessions took place in 1961 and went through a format popular then of strings of solos backed by fairly hectic riffing by the rest of the group. Some of it sounds rather dull today — especially the rhythm sections — but the star soloists could shine in any company. Russell is particularly soul-searing when the mood takes him. There's an excellent, erudite sleeve note essay on the origins of the jam session from the late Ralph J. Gleason. JH



Black Lion Records BLP 12119

Dave Shepherd Benny Goodman Classics

Benny Goodman has had a massive influence on jazz and jazz clarinet playing for nearly fifty years. Dave Shepherd, an

ardent British admirer, put together here ten of B.G.'s famous small group performances and, surrounded by like-minded musicians, exhibits his unique skill in the B.G. mould. Brian Lemon's piano playing is superlative throughout and Lennie Hastings proves once again that, in his style, few home-grown drummers can match him. The Goodman classics include *Poor Butterfly*, *More Than You Know*, *Exactly Like You* and *Limelight Blues*. JH



CBS 81150 £2.99

Maynard Ferguson Primal Scream

Primal, that is, against the standards of Bob James, who produced it (and commonly arranges the glossy CTI packages) and of Ferguson himself, who while often brash is not what you'd think usually call one of music's great primitives. Not very primal in fact, neatly orchestrated on the brass and with half a dozen electric pianos chattering away underneath in case the screamer pauses for breath. It's that sort of music this time. Within those rather restricting limits, it's done extremely competently, as you'd expect from the involvement of Chick Corea, Joe Farrell, Steve Gadd and other heavies. Given that the bandwagon was there to be jumped on, Ferguson's trajectory onto it cannot be faulted. RB



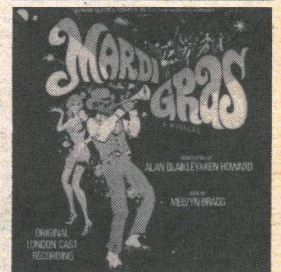
Verve Select 2317 111

Count Basie and Joe Williams Swingin' With The Count

Reissue of a classic album recorded '55 and previously titled *Count Basie Swings Joe Williams Sings*. This was Joe's first album with the Count and produced Basie's first hit single since the Forties with *Everyday* (I Have

The Blues). Rarely has a voice been more integrated with a big band to produce an overall sound where individual talents are submerged in the business of making music. *Alright, OK, You Win* gets a definitive performance in an album which redefined the relationship between band and vocalists. MS

FILM SHOWS



EMI EMC 3123

Mardi Gras Original London Cast Recording

The scene is carnival time in New Orleans; the music is good time and jazzy; and Melvyn Bragg wrote the book on which this Alan Blaikely and Ken Howard musical is based. The music — with Nicky Henson and Dana Gillespie in the lead roles — is that rare blend designed to catch heart, and feet, soul and occasionally tears as you surrender to the charms and characters of sleepy, happy time down South. MS



MGM Super 2315 373

That's Entertainment, Part 2

Part 2 of the film of the films is a feast of celluloid heroes and heroines from the lion that roared. There's Kelly and Astaire, Crosby and Garland, Chevalier and Gingo and — winning by a nose — Jimmy Durante singing (?) *Inka Dinka Doo*. The films include "Singing In The Rain", "Two Girls And a Sailor", and "For Me And My Gal". And the song include *A Couple Of Swells*, *I Remember It Well* and *Easter Parade*. With such a cast it's doubtful if anyone could ever afford to make such an album today, let alone a film, but there's gold in them there archives. MS

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RECORDS TO BUY CLASSICAL



Decca SDD495 £1.99

Berlioz Fantastic Symphony

O/Stokowski
Stokowski's *Phase-Four* recording, with the unmistakable Kingsway Hall sound, transferred to a cheaper reissue label. Essentially a disc for those 'into' Stokowski, since his reading is full of individual touches of colour, changes of tempo, etc. These are rather crudely underlined by the engineering, which fussily brings out this and that for special attention. How, I wonder, did Stokowski get his effect with the bells in the finale — with what are they doubled? (Berlioz prescribed pianos.) Some overloading and exaggerated channel separation, these are *Phase-4* clichés; how much more electrifying the interpretation would have sounded with pure concert-hall quality. CB



DG 2530 699 £3.59

Tchaikovsky Symphony 5 in E-minor

Berlin Philharmonic/Karajan
A new Karajan recording, produced in the Berlin Philharmonic Hall, his *third* version of this symphony in eight years. It would be hard to choose between the two most recent performances — for instance I much prefer the passage after the mid-movement climax in the *andante cantabile* on HMV, but not the attack on the finale *allegro*. The *valse* is less mannered here, marginally. Nor is it possible to be categorical about recording preference, although the EMI production, in a reverberant setting, with more distant balances than here, is completely contrasted. The brighter DG, with its immediacy, will sound well on most systems, but paradoxically with the

Naim/Supex combination I find it slightly small-scaled, and the sense of depth opening out on HMV is impressive. CB



Decca SXL6811 £3.25

Bernstein/Copland/ Gershwin Candide overture.

Appalachian Spring. An

American in Paris

Los Angeles

Philharmonic/Mehta

With its charming cover, this will surely prove the most popular of the recent discs 'celebrating America'. Mehta conducts a marvellous performance of the Gershwin, with string playing of apt Hollywood lushness. This starchy-eyed music has all the unreality of those American romance-drama films set in dazzling night-clubs, dinner-dress black and pearl-white. The pinpoint stereo has great depth and solidity, offering enormous fun. In the Copland, the composer's rearranged score for full orchestra, I get the impression that the quality is thinner at the outset: certainly a different sound from side 1. Mehta is best in the Stravinsky-like 'busy sections'; his slow woodwinds lack poignancy and the lanky rhythms aren't as authentically cranky as in Copland's own recordings. *Candide* sounds very gallic here: a good version, but do hear Bernstein himself (CBS 30043), not just for the stunning New York flautist, but for a reading that is leaner, zippier, one that sounds like a curtain-raiser to something memorable. CB



CBS 76501 £3.49

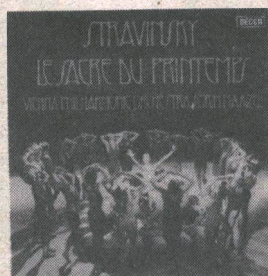
Schubert Piano sonata in B flat, D.959

Rudolf Serkin

If you like your Schubert like polished cherrywood, then

Curzon's Decca recording will appeal more than Serkin's. Serkin's Schubert is like gnarled oak, plain and rugged. But Rudolf Serkin makes you listen to the music, note for note, rather than make assumptions about it. Some will find his detailing fussy, his touch too uncertain (e.g. in the trio), but for me his exposition of the long and masterly opening movement — a whole LP side — is without peer. The observance of the repeat seems to me essential, especially as Schubert writes nine bars of lead-back, ending in an angry fortissimo trill, which makes a superb culmination in Serkin's hands. Such is this pianist's musical integrity that he makes a soft pianissimo sound difficult: since that is something easily superimposed as a pianistic effect, but for Serkin it must be painfully wrought as part of the structural and expressive context.

The engineers have produced a rather distant, shallow quality, and I suspect that attempts have been made to set the microphones to minimise the effects of Serkin's vocal commentary. The German-cut pressings are impeccably clean. You may find copies at the short-term offer price £1.99. Even at full price, a record to treasure for those attuned to this artist. CB



Decca SXL6735

Stravinsky Rite of Spring

VPO/Maazel

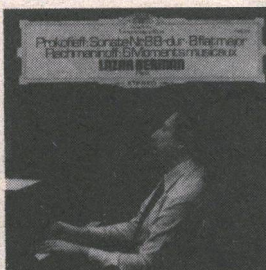
(also DG 2530 635

LSO/Abbado)

Maazel gives a polarised view of the *Rite*. I think Stravinsky wrote of him as stiff, bandmasterly; as if to refute this Maazel romanticises the *Rite*, with some challenging and individual tempo relationships. Few will accept those eleven chords in Part 2 (at 103), although the logic of the spacing is clear. Decca have provided superb recording quality, with essentially concert-hall balances, and impressive bass response.

Abbado's is an extremely neutral interpretation, faithful to the score in every way, but the effect is impersonal. The

DG production brings out a wealth of detail, by careful techniques. These discs are best as supplementary issues, for those who specialise in interpretations of this endlessly fascinating score. CB



DG 2530 678

Prokofiev/ Rachmaninov Sonata 8; Moments musicaux, Op. 16

Lazar Berman

Prokofiev's third 'war sonata' is not an easy work, nor is its nature well defined on the DG sleeve. We have had Richter's white-heat account, and an excellent Ashkenazy/Decca coupling. Berman is worth comparing with these; his playing is always compelling, but there is a bear-like heaviness after Richter's fury; finally one concludes that Berman wants to make his compatriot's score ingratiating to his audience. Turn the disc, and in Rachmaninov's emotional world he is in his element. Magnificent engineering of the instrument: these tapes prompted Karajan's instigation of the magical Tchaikovsky piano concerto collaboration. CB



DG 2530 632 £3.59

Dvorak String Qt. in F, Op.96; in A-flat, Op.105

Prague Quartet

A loving and completely idiomatic account of the *American Quartet*, coupled with Dvorak's last major work, happily Czech rooted. A finely balanced recording, a co-production with Supraphon (who made an earlier version of this coupling with changes in personnel in the group). Sound quality fairly bright and forward, cello tone notably true. CB



HMV ASD3228 £3.50

Liszt B-minor Sonata;

Mephisto Waltz 1, Venezia e Napoli

Lazar Berman

Saga recently refurbished Berman's 1958 London produced recording of the Sonata, which proved careless and uncontrolled. It is depressing to find his new *Melodiya* version offers little more than powerful virtuoso playing. Younger artists, Roge, Argerich, have made far more interesting recordings; Arrau remains supreme. In the couplings too Berman is heavy-handed, and impression of relentlessness exaggerated by a clanky, aggressively close balance. The image is narrow in width, with some obvious fading up at the end of *Mephisto*. Regrettably to find pianistic enthusiasm, but so little inwardness. CB



Argo KZRC603 £3.50

Rossini/ Donizetti String Sonatas 2, 4; String Quarter in D (arr. strings)

St Martin's Academy/Marriner
Decca Group continue to make inroads into their classical back-catalogues, issuing cassette transfers; this is an excellent version of a 1969 coupling. Although I tend to use the two Philips discs by I Musici, of the Rossini string sonatas, as a test for string reproduction quality when assessing new equipment — and indeed for musical pleasure — I have to say that Neville Marriner's players bring even more zest and colour to the music. The other four sonatas have been available on tape for some time; readers will welcome the chance to complete the set, and to acquire the delightful Donizetti transcription. CB

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If you're looking at the bewildering array of stereo cartridges on the market, you should be aware that the most accurate reproduction from the record groove is achieved by lowering the effective mass of the moving parts of the cartridge. In other words, look for a cartridge with a stylus tip that's allowed to accelerate and decelerate easily to follow the complex modulations of the record groove more accurately. Your hi-fi dealer will confirm that ADC are about $\frac{2}{3}$ the size and weight of other magnetic cartridges. This is largely due to our exclusive *induced magnet* system. A system which replaces heavy conventional moving magnets with a tiny feather-light armature.

This significantly reduces the cartridge's moving mass, resulting in groove tracing with the highest degree of accuracy and lower distortion.

It also means high frequency resonance can be damped electro-magnetically.

This form of damping not only remains absolutely precise and consistent, but also avoids introducing distortion.

The ADC Q36 cartridge is designed for medium and high priced manual turntables. Hi-fi magazine critics in their testbench articles have always been impressed by the Q36's high definition and sound separation.

At £18.45p (inc. VAT) we know you'll find it extremely good value for money.

ADC Q36 SPECIFICATIONS

Output at 5.5 cms/sec 5.5mV

Tracking force range $\frac{3}{4}$ to $1\frac{1}{2}$ grams

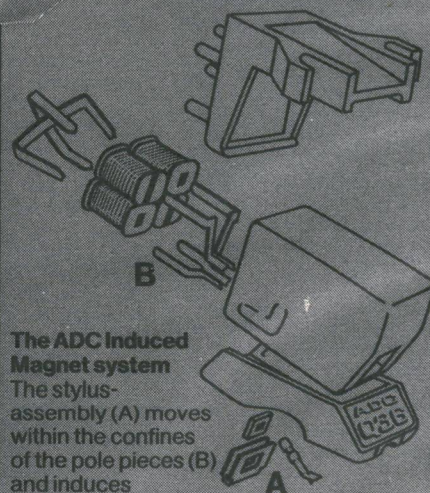
Frequency response 15Hz to 20kHz \pm 3dB

Channel separation (nominal) 26dB

Compliance cms/dyne 30×10^{-9}

Stylus tip Elliptical .0007" x .0003" radii

Recommended load impedance 47,000 ohms



The ADC Induced Magnet system

The stylus-assembly (A) moves within the confines of the pole pieces (B) and induces magnetic flux. Because there is no mechanical linkage the mass of the stylus is reduced, increasing vertical and horizontal compliance.

ADC Q36

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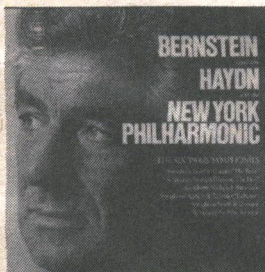


Decca K4W 32 £16.00

Wagner Götterdämmerung

Nilsson/Windgassen/Fischer-Dieskau/Ludwig/Neidlinger etc/VPO/Solti

Has the Solti *Ring* really been available for twelve years? To mark the Bayreuth centenary Decca have transferred the four sets to cassette, at special prices until next March. This electrifying *Götterdämmerung* was the culminating achievement in John Culshaw's series — a landmark in recording production, and a triumph for Solti. Clearly the engineers have taken the greatest care with these transfers, for it is only on the most critical equipment (e.g. NEAL103/Naim) that the comparative crudity of the sound, as compared to disc, is revealed. One could do without the pulses that herald each side, but breaks are fewer than on the LP equivalent, background noise is almost unheard, and the dynamic range and stereo imagery is excellent. The convenient-format illustrated libretto includes full synopsis and an essay by Culshaw. By no means a committed Wagnerian, I have found listening to these tapes a potent experience! **CB**



CBS 77307 (3 LP) £7.99

Haydn Symphonies 82-87

New York Philharmonic/Bernstein
Haydn with big gestures all round: including the price tag, which is high when comparatively little trouble seems to have been taken in cutting these transfers. At ends of sides at least, the SBRG originals were much cleaner. The acoustic is reverberant, balances are close, and there is some congestion. Still, a Supex

cartridge makes these recordings tolerable, and — however shocking to purists — I recommend Bernstein's *Paris* symphonies in preference to Dorati's 'Marl-moreal' set. If heavy-handed in places, the readings are imaginative, warm-hearted, and in the fast movements zesty. I suspect that Bernstein actually used reduced string, although the sound is inflated. **CB**



Decca SDD490 £1.99

Bruckner String Quintet in F

Vienna Philharmonia Quintet
One of a series of *Ace of Diamonds* recordings made in the Sofiensaal by members of the Vienna Philharmonic. Bruckner wrote his quintet many years after it was first requested, between symphonies 5, 6. He was persuaded to substitute a simpler scherzo (with the identical trio), for the players, and that Intermezzo is placed first on this disc. The adagio has many of the hallmarks of the great symphonic slow movements: an identical arching theme, ecstatic trills, just as in the scherzo there is a 'retracing of steps' as heard in the *eighth*. The performance is very direct, very fine, except that the coda of the adagio lacks poetry and subjectiveness. I could not fault the recorded sound, or the pressing. **Recommended.** **CB**



HMV ASD3212 (SQ) £3.50

Berlioz Overtures — Le

Corsaire; Beatrice et Benedict; Le Carnaval Romain; Benvenuto Cellini; Les Francs Juges
LSO/Previn Previn's disc is worth comparing with Colin Davis's or Munch's Berlioz. Everyone agrees that *Les Francs Juges* is the best item

here, and this is outstandingly well recorded, with superb deep brass and a positive shock impact to the sharp accents. Strings, balanced close, could be even more distinguished. The dynamics expand well, and EMI have provided flat, silent-surfaced pressings — very necessary for the proper high replay level. The tuttis on side 1 sounded a shade hard with Quad Electrostatics. Mostly one thinks that this is about all one could reasonably expect from a stereo disc today, yet going back to Davis's LSO collection (Phillips SAL3573), which dates from 1966, one finds that the quality is hardly inferior at all. A repressing on *Universo* would sweep the board, especially when Davis brings a very desirable tension into the performances, where Previn suggests a dangerously relaxed attitude rather too often, for my taste. **CB**



Philips 6580 120

Mozart Violin Concertos 2,4

Herman Krebbers/
Netherlands Chamber
Orchestra/Zinman

Another concerto recording from the Concertgebouw leader — almost as fine as his Brahms (also *Universo*). The accompaniments are very stylish, thus the Joachim cadenza in K.218 stands out of character with the rest (Zinman's is used in K.211). The recording projects the soloist rather aggressively, and the orchestral bass is somewhat foggy; however, pressing and transfer qualities are very clean. **CB**



DG 2530 706 £3.59

Beethoven Symphony 7 in A VPO/Kleiber

Carlos Kleiber's Beethoven seventh — the sixth current version with the Vienna Philharmonic — is like a modern counterpart to Toscanini's classic NYPSO set of 78s. Practically all repeats are observed, first/second violins are separated across the stage, and the tempi include a genuine allegretto and presto scherzo. The trios are not too slow; the finale is very fast but precisely detailed. Above all, this is a lean, motoric account — not for those who fancy spread chords and excess weight. A distinguished follow-up to Kleiber's *fifth*. **CB**

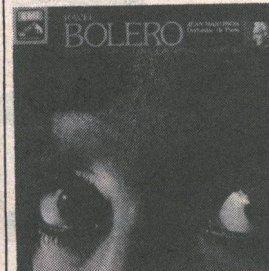


EMI EMSP553 £5.35

Poulenc Sonatas

Fevrier; Menuhin; Fournier; Civil; Wibraham; Debost; Portal etc

A delightful double-album of works for various instrumental combinations, ranging from the early sonata for two clarinets (1918) to those for clarinet and piano, and oboe and piano of 1962. Some of the music is slight, astringent, witty; later scores include the *Elegie* in memory of the hornist killed in a motor accident, Dennis Brain, and the fluid and sensitive flute sonata of 1958, superbly done by Michel Debost, with Jacques Fevrier (piano). The engineering and general presentation are good. **CB**



HMV ASD3215 (SQ)

Ravel Bolero; La Valse; Rapsodie Espagnole; Overture Sheherazade

Orchestre de Paris/Martinon
Ravel's early, unpublished *Sheherazade* (which the composer felt betrayed too many Russian influences) is the main attraction of this

reissue from HMV SLS5016. A charming and delicate little piece, it anticipates the scoring techniques of 'Beauty and the Beast'. The rest is perfectly acceptable and spaciouly recorded, but there are more distinctive alternatives — for instance, Ozawa's Boston couplings, awkwardly laid-out on DG. The hypnotic repeated figures in *Rapsodie* were more telling in Martinon's earlier RCA/Chicago version; *Bolero* ends slightly untidily, lacking the panache of Maazel's performances; Previn on HMV avoids the underlining of tempo contrasts made here in *La Valse*. **CB**



CBS 76526

Franck/Faure Symphony in d; Suite: Pelleas et Melisande

NPO/Andrew Davis
RCA GL2500

RCA Victor Orchestra/Boult (*Symphony only*)
Of three recent versions of the Franck Symphony (also Orchestre de Paris/Barenboim on DG) the best recording quality comes, surprisingly, from Boult's RCA-Reader's *Digest* production, some years old. That has a nicely extended range, where the CBS suffers not only from crude stereo spotlighting of instrumental blocks, but string tone which sounds restricted and dated. Less surprisingly, Boult directs the most mature and straightforward account, where Davis and (particularly) Barenboim opt for slower tempi. Barenboim shows more individuality as a conductor than Davis, but the latter produces, paradoxically, the more interesting reading — almost Brucknerian in expansiveness. He is most successful in the first movement, and his record contains an account of the Faure (composed for a London production of Maeterlinck's play in 1898) with a charm worthy of Beecham. The tri-lingual notes have no account of the Faure in English. Andrew Davis, like Boult, seems happy in the atmosphere of the recording studios. **CB**

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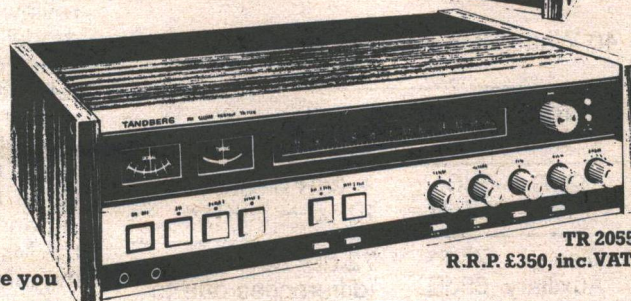
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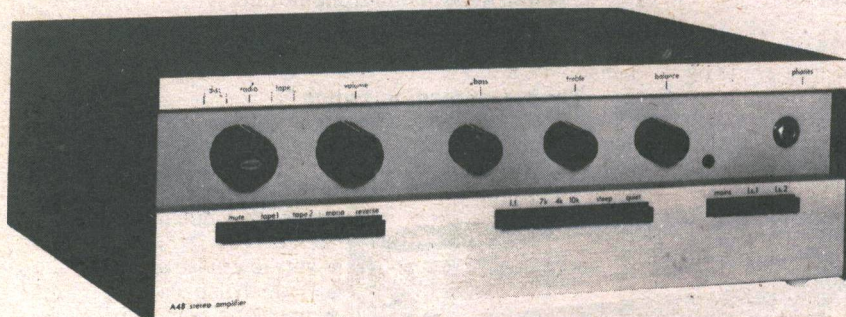
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Manufacturers Specification

Audio T Test Results

Power Output

both channels driven at 1 KHz into 8Ω at clipping

40 Watts RMS

43 Watts RMS

Frequency Response

± 1dB, 30Hz — 20KHz

± 1dB, 15Hz — 24KHz

Power Bandwidth

+ 0dB, -3dB, 15Hz — 35KHz

+ 0dB — 3dB, 10Hz — 36KHz

Signal/Noise Ratio

weighted to 30 phon equal loudness correction

Disc 75db
Auxiliary 85dB

72 dB Din weighted (differences due to 82dB different weighting curves)

Harmonic Distortion

at 1 KHz just prior to clipping

Less than 0.1% into 8Ω load

At 1 watt 0.16% *
At 10 Watts 0.06%
At full output 0.11%
*predominantly noise

Input Sensitivities

Diac input will accept input of 110 mv at 1 KHz without overload

Disc 2,5mv imp. 47K
Radio 100mv imp. 180K
Tape 100mv imp. 180K

Confirmed

Test Equipment: Radford LD0, Hewlett Packard 334A, HK Power Meter, Ferrograph ATU1, Tektronix 502A, P.A.R. White (Audio T Engineer)

AUDIO T-COMMENT

The new Sugden A48 II as reviewed supercedes the original model which has become established over the past few years as a reliable English made amplifier with an exceptionally clean sound. Essentially the same amplifier but with a modernised styling (still not up to the high standard of most Japanese products unfortunately), the Mk II conformed closely to the manufacturers specifications in all aspects. At 43 watts per channel into an 8 ohm load the amplifier should drive most loudspeakers likely to be used in domestic situations. What the measured performance does not convey is the very open clear sound this amplifier produces. At a normal selling price of around £150.00 the A48 II faces some strong Japanese competition, in particular the Rotel RA 812, Technics SU 3500 and the Yamaha CA 600 which are all known to be extremely reliable, well made products. But if sound quality is what really interests you — give the Sugden a listen, you should be pleasantly surprised. One of the few British amplifiers we can strongly recommend.

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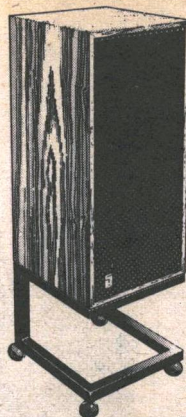
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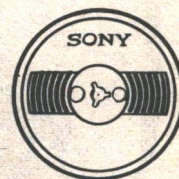
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(Note:

The opening observation is attributed to W. Shakespeare, in 'Much Ado about Nothing', III, V)



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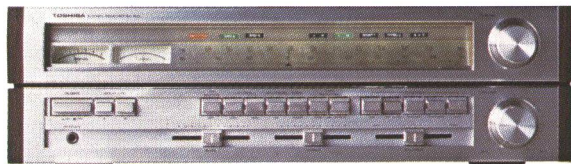
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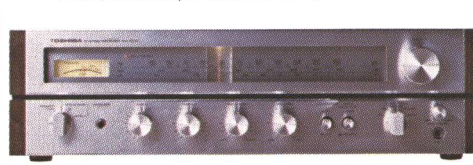
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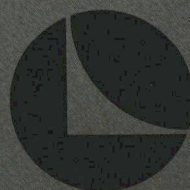
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Anyone who owns a cassette deck will know how the ejection mechanism can mistreat the cassette.

And you'll know how mistreating the cassette can impair Hi-Fi performance.

If you know all this, you ought also to know about Aiwa's front loaders which treat cassettes very differently.

The Aiwa AD 6500 has a unique way of handling a cassette: you simply place the cassette on the horizontal carrier and push the lid down gently onto it. The automatic motor drive then transports the cassette into the machine and inclines it at a 30° optimum operating angle.

Our more compact front loader, the Aiwa AD 6300 uses our patented oil-damped cassette ejection mechanism to prevent your cassettes being treated like a piece of toast.

NO ONE ELSE TREATS CASSETTES THIS SERIOUSLY.

The reason why all of our decks handle cassettes differently, is that we are one of the very few Hi-Fi companies specialising in cassette technology.

This explains why we're the only company who, have commissioned Angus McKenzie Facilities to test 40 different makes and types of cassette on our decks to determine optimum compatibility. And we'll supply his findings with your Aiwa cassette deck.

You will also find that both our specifications and features on these decks

represent at their price level, a true state of the art. "From the evidence of our measurements," said Dennis Killick writing in *Cassettes and Cartridges*, "the AD 6500 is not merely another stereo cassette deck but it is indeed a precision instrument operating to the best high fidelity standards."

FEATURES THAT PUT US IN FRONT.

They both have three position independent bias and equalisation switching to make the most of today's tapes, and to protect the deck from becoming obsolescent from tomorrow's.

They both have a peak level indicator system, (in the case of the 6500 with indicator lights at +3dB and +7dB levels.)

They both have Aiwa's patented quick review/cue controls so you can easily find your way around a tape.

And their wow and flutter and signal to noise ratio figures (0.07% wrms and 62 dB, Fe Cr Dolby on, in the case of the 6500) represent new performance levels in their price class.

£159 IS WHERE WE START.

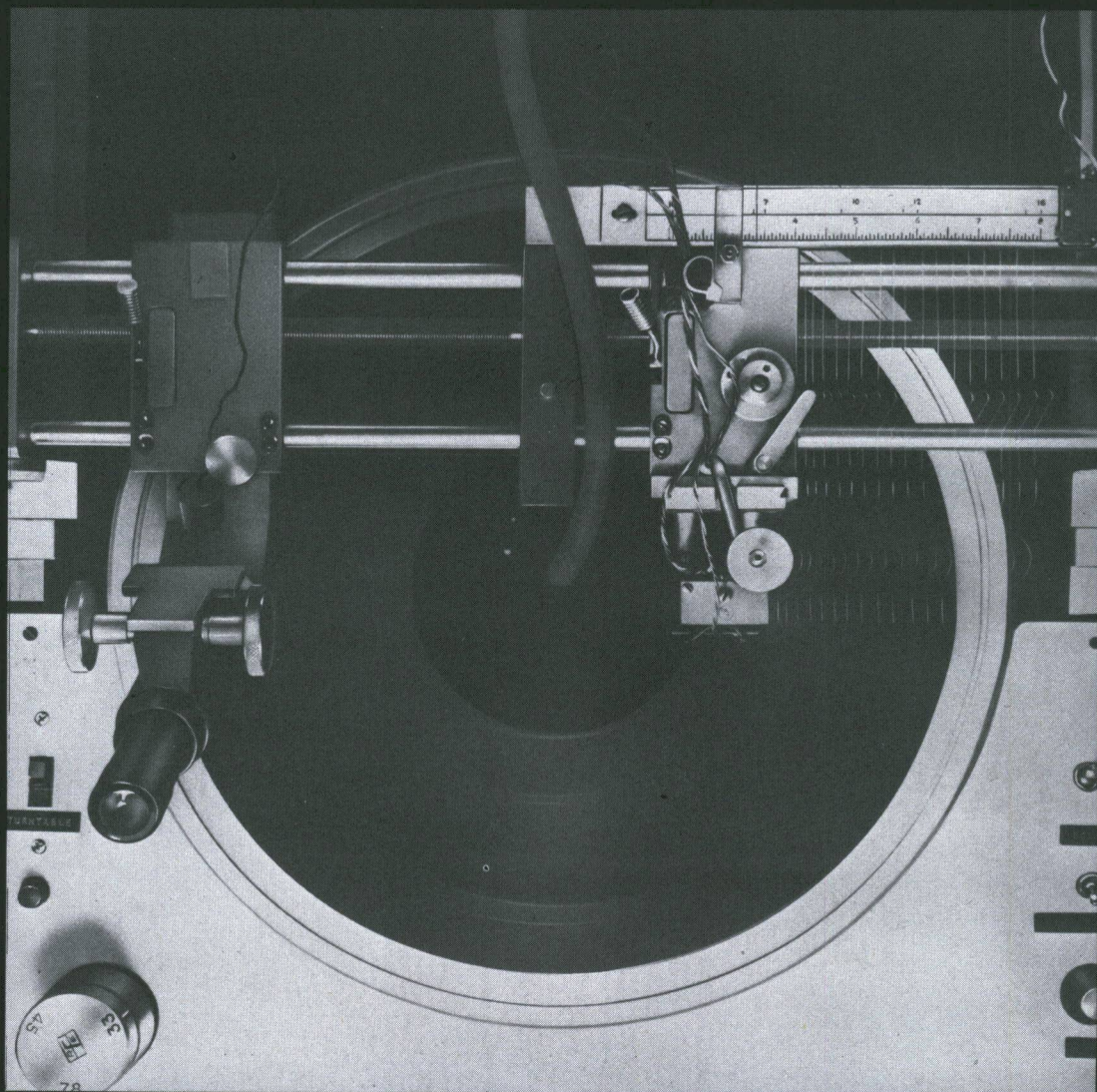
The new Aiwa AD 6300 for all its advanced features has a singularly unadvanced price, costing around £159. And the high performance Aiwa AD 6500 costs around £230.

And whichever you choose, we can promise you a treat for your cassettes, as well as for your ears.

AIWA®
THE FRONT LEADERS



AIWA SALES & SERVICE (UK) LTD., 30/32 CONCORD ROAD, WESTWOOD PARK TRADING ESTATE, ACTON W3 0TH.
THE PRICES SHOWN INCLUDE VAT AT 12½% AND ARE CORRECT AT TIME OF GOING TO PRESS.

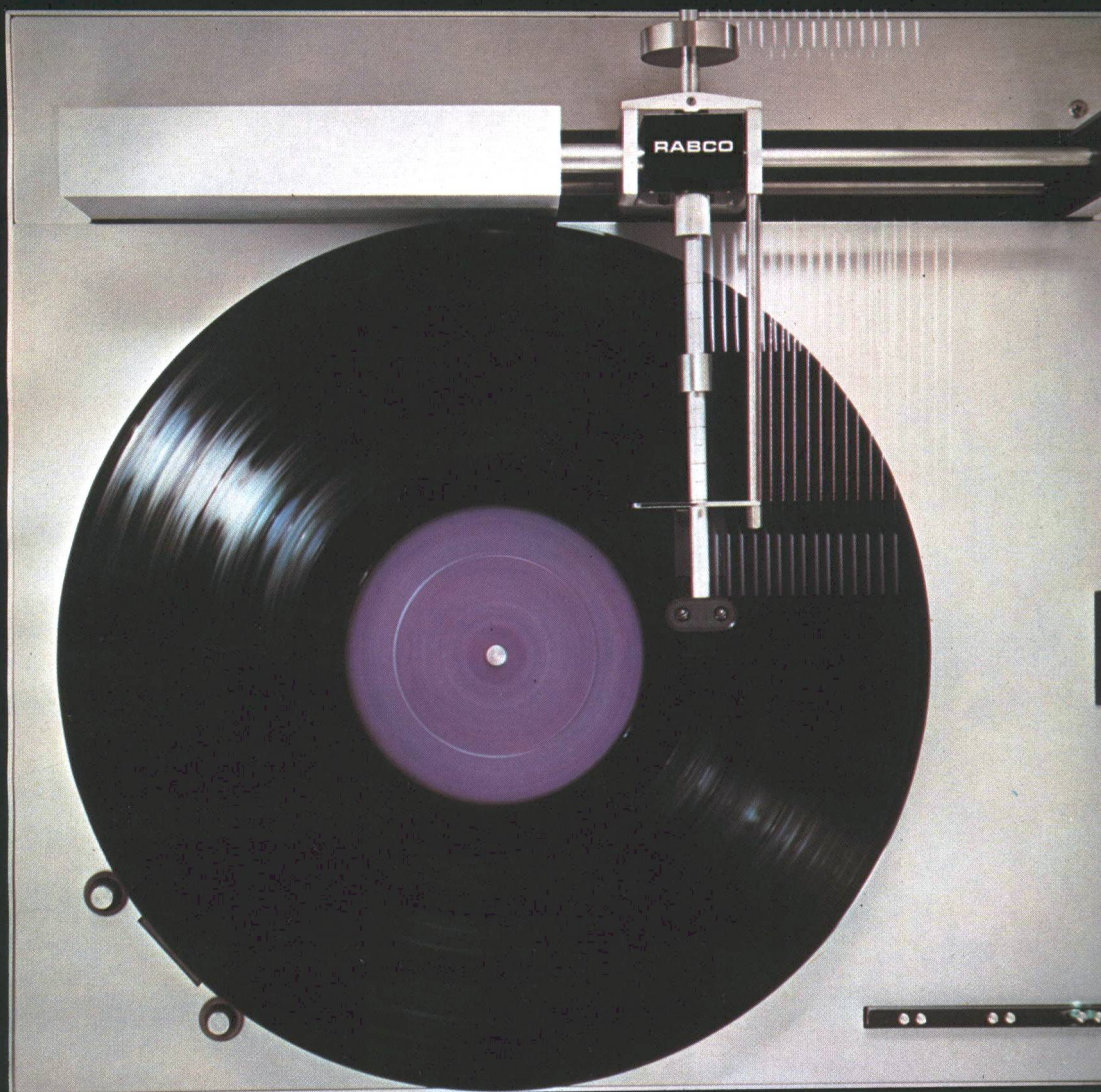


This is how discs are made.

A master disc is cut on a special lathe. The cutting head moves across the master in a straight line from the edge to the centre. The special stylus inscribes a groove in the surface of the disc.

Ideally, a turntable system should enable the stylus in your cartridge to meticulously follow the "path" inscribed during the cutting process. That is, it should play your record precisely as the master disc was originally cut.

A "straight line tracking" turntable system, properly designed, engineered and manufactured, could eliminate problems such as skating force, tracking error, and the resulting excessive record wear, all of which are *inherent* in pivoted arm systems in all their forms and modifications.



This is how the ST-7 plays them.

The Rabco ST-7 is a *straight line tracking turntable*. Your stylus precisely follows the original path cut into the master record. The result is the total elimination of *both* tracking error and skating force.

The ST-7 begins with straight line tracking. In every other respect — motor, suspension, bearings, drive, controls — it is exemplary of a professional instrument designed for home use.

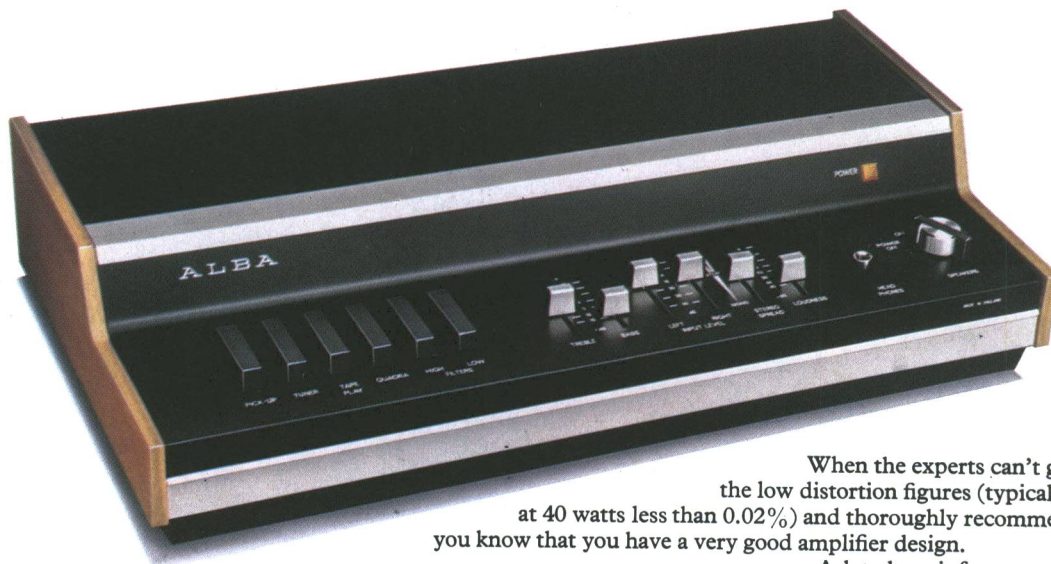
The ST-7 offers a cascade of zeroes. Zero tracking error. Zero skating force. Zero stylus overhang. It plays music in the home in a way that makes conventional pivoted arm systems obsolete. For complete information write Harman Kardon, Tannoy Products Limited, St John's Road, Tyters Green, High Wycombe, Bucks HP10 8HR.

harman/kardon

ALBA 900

"One of the best British amplifiers"

Gordon King—Hi-Fi Sound



When the experts can't get over the low distortion figures (typical distortion at 40 watts less than 0.02%) and thoroughly recommend the unit, you know that you have a very good amplifier design. Ask to hear it for yourself.

And now...the ALBA 1500

where precision tuning combines with purity of stereo amplification

Designed to combine a high quality tuner and stereo amplifier in one cabinet, the Alba 1500 includes outstanding features previously only available separately in the Alba 700 amplifier and the Alba 800 tuner. Teak veneered with black facia or white satin finish with black facia.

Write for complete specifications and full Test Reports, and for colour booklet of new Alba '76 range to: Alba (Radio & Television) Ltd, Dept. C3 Bull Lane, Edmonton, London N18 1SD.

ALBA—worth coming home to!



Two Aces from SENNHEISER



The HD 400 — A new model at a competitive price. Featherweight, comfortable and superb performance.

The HD 414X — An improved version of the well known HD 414, with sales in excess of 1 million. Lightweight, comfortable and with a performance recognised in many professional circles, for its high quality.

You get a fair deal from Sennheiser so why not call on your local dealer today for a demonstration and join the family of Sennheiser enthusiasts.

To learn more about the equipment write for a brochure or consult your local Sennheiser dealer.

HAYDEN LABORATORIES LTD
Churchfield Road, Chalfont St. Peter
Bucks. SL9 9EW
Tel: Gerrards Cross (02813) 88447

HAYDEN

Please send more details on Sennheiser Headphones

Name _____

Address _____

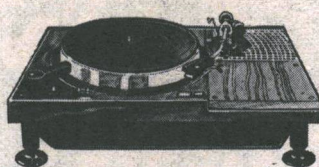
Code _____
HFP 11

CHOICEST...EQUIPMENT...BEST...SERVICE



SONY

Sony have a new range of low cost high power amplifiers and in particular the TA 3650 which is the lowest priced 60 watt amplifier on the market. Don't forget the TA5650 V FET amp. for excellent sound and the new TC186 cassette deck - the best budget front loading deck we have tested.

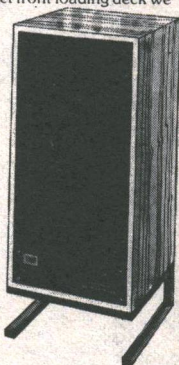


Technics

The superb range of turntables are possibly the finest available. Also interesting is a new selection of Amps., Tuners and Receivers. It has always seemed a contradiction to us that budget loudspeakers are usually small and inefficient and almost all budget Amps and receivers lack the necessary power to drive them adequately. Technics have now put this right with this new range of high power low cost equipment - need we say more.

CELEF

From the 'Domestic' which is ultra efficient and will produce high sound levels from a very few watts to the Studio Professional which is a no compromise monitor we have a range of well planned and attractively priced loudspeakers to suit most tastes and budgets.



IMF

After a long period of painstaking research IMF have now introduced a formidable range of loudspeakers culminating in the Professional Monitor Mk IV - one of the finest 'state of the art' transducers available anywhere. Each of the models has an inherent musical quality which is most satisfying over long periods of listening.

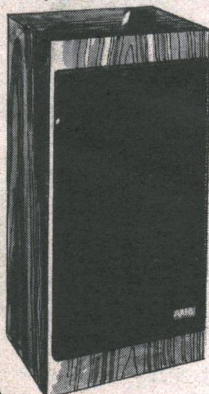


TRIO

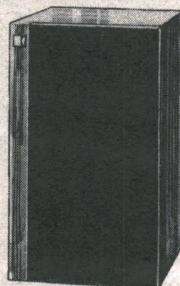
Trio have now dropped their 3300 series and replaced them with the 1500 and 3500 series at 25 and 40 watts respectively. Both these amps, and the new matching tuner are strongly recommended and are stocked by all branches. There is an excellent new budget turntable (1033) which is well worth investigating.



The ever popular loudspeaker range from AR is further enhanced with three new exciting models, the AR16 (illus.), AR14 and AR12. All three are the result of an extensive research programme and are a departure from what has become popularly known as the 'AR' sound. Also new is a revised version of the highly successful AR7, now renamed AR7x and employing a newly designed black foam grille and new tweeter. Any of our branches will be pleased to arrange a demonstration.



Kef look like having a good season. The new Corelli, Calinda and Cantata models sound very good indeed and just look at the review in 'Hi-Fi Choice' of the Ref. 103. Why not come and audition these models to see if you agree with the experts.



MONITOR AUDIO

NEW MODEL

KJ are the first to offer you the opportunity to see and hear the super new MA3 Mk II - a really significant improvement indeed over the original model. The changes are wide ranging and include the introduction of a new tweeter and mid-range unit as well as a much revised crossover.



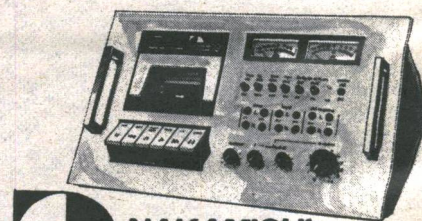
Audiomaster LS3/5A MONITOR

At last after a period of unavailability the LS3/5A is here again. Designed by the BBC and made under licence from them by Audiomaster, the LS3/5A conforms in every way to the most stringent specification laid down by the BBC. If you haven't yet heard them pay one of our branches a visit and you'll soon realise why so many superlatives have come their way.



AIWA

AIWA continue to hold their position in one of the most competitive areas of the Hi-Fi market. We know of no other budget deck to equal the AD1300 for sound quality and the 1800 is still one of a select group of decks that is suitable for really top end systems. We look forward to receiving the new front loading AD6300 which should be in stock during September.



NAKAMICHI

Nakamichi have now made available their incredible engineering technique at a much lower price than previously by the introduction of the model 600, a significant new two head cassette deck with the legendary Nakamichi performance which now rivals the high quality open reel machines.

We are stockists for:-

AR, ADC, AIWA, AKAI, AMCRON, ARMSTRONG, AUDIOMASTER, BGW, CELEF, CELESTION, DAYTON WRIGHT, DIRECT DESIGNS, DUAL, DUNLAP CLARKE, FERROGRAPH, FIDELITY RESEARCH, FONS, GALE, GARRARD, GOODMAN, HARMAN KARDON, IMF, JBL, KEF, LENTEK, LEAK, LUX, MARANTZ, MAYWARE, MICRO ACOUSTICS, MONITOR AUDIO, NAKAMICHI, PIONEER, QUAD, RADFORD, REVOX, JIM ROGERS, ROTEL, SANSUI, SME, SONY, SONUS, SPENDOR, STANTON, STAX, TANDBERG, TEAC, TECHNICS, TRIO, UHER, WHARFEDALE, YAMAHA.



KJ LEISURESOUND

Opening Hours Monday - Saturday 9.30 am - 5.30 pm
Thursday late night until 8pm

LONDON W.1. - 48, Wigmore Street
WATFORD - 101, St. Albans Road

Tel: 01-486 8263
Tel: Watford 45250

HARROW - 27, Springfield Road
UXBRIDGE - 278, High Street

Tel: 01-863 8690
Tel: Uxbridge 33474

. INSTANT...CREDIT...EXPORT...WELCOMED.

5 STARS TO KJ say PRACTICAL HI-FI & AUDIO

In a recent comprehensive survey of London Hi-Fi retailers the section devoted to KJ concluded "Five stars to KJ for the five star service and facilities". We're proud of our reputation for giving customers a square deal. In the boom years there have been many examples of new firms offering sensational low prices and claiming to offer everything for next to nothing. Many disappeared, leaving a trail of havoc—unfulfilled orders on goods paid for but never delivered, faulty equipment—customers are unable to get serviced and so on. Most of these firms traded on their ability to attract buyers purely by low prices, they had no expertise, no back-up service, no pride in their service and worst of all they didn't care. We do care at KJ, we have always cared and what we give you in addition to all our normal facilities is reliability and security—that really counts for something when you look at the number of firms no longer trading. KJ has been established over 12 years and we intend to be around for many years to come.

OUR REPUTATION IS YOUR GUARANTEE.

AKAI

CS34D	£94.95
GXC39D	£135.95
4000DS II	£119.50
4000DB	£169.90
AA1020	£149.50
+ other models (please ring for competitive prices)	

Celestion

Ditton 15 pr.	£84.90
Ditton 44 pr.	£155.50
Ditton 66 pr.	£259.90
+ other models (please ring for competitive prices)	

Garrard

SP25 Mod M75-65	£35.50
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Goodmans

RB18 pr.	£49.90
RB20pr.	£64.90
RB35 pr.	£89.90
Achromat 100 pr.	£74.90
Achromat 250 pr.	£109.90
Achromat 400 pr.	£145.00
Din 20 Kit pr.	£28.50
Mezzo Kit pr.	£49.00

LEAK

3020 pr.	£89.90
3030 pr.	£119.90
3050 pr.	£169.90
3080 pr.	£249.90
3200	£169.90
3400	£209.90



Chassis & Kits

	P & P each	
T27	0.45	£5.95
B110	0.65	£7.99
B200	0.65	£9.40
B139 2	0.95	£18.95
DN8	0.30	£2.30
DN12	0.30	£6.45
SP1015	0.30	£4.85
SP1017	0.30	£4.35
P & P £1.75 per order or as stated.		

KEF Kit 1 pr.	£54.50
KEF Kit 3 pr.	£99.90
P & P £2.75 per pair	

HEADPHONES

AKG K140	£14.95
Jecklin Float	£125.00
Koss HV1A	£23.60
Pro4AA	£30.95
K6	£13.65
Phase 2	£37.50
Pioneer SE205	£11.75
SE305	£18.75
PWB M.Coil	£17.95
Sennheiser HD414	£14.95
HD400	£9.95
HD404	£20.75
HD224	£32.95
Stax SR40	£63.95
SR5	£82.95
SRX3	£137.95

PIONEER

SX450	£118.50
SX550	£145.95
SX650	£205.00
SX950	£373.00
SX1250	£569.90
SA5300	£64.50
TX5300	£72.95
PL112D	£56.95
PL115D	£68.50
CTF 2121	£127.50
CTF 9191	£282.90
+ other models (please ring for competitive prices)	

ROTEL

RX 202 Mk.II	£93.95
RX 402	£129.50
RA 312	£61.95
RA 412	£74.95
RT 324	£69.95
RP 1500 Arm.	£62.50
RP 1500/SME 3009	£89.90
RP 3000 Arm.	£103.95
RP 3000/SME 3009	£121.95
RD 20	£136.95
+ other models (please ring for competitive prices)	

SONY

STR 4800	£179.90
STR 5800	£225.00
STR 6800SD	£269.90
TA 1630	£79.95
TA 2650	£99.95
TA 3650	£139.95
TC 377	£159.95
TC 756-2	£375.00
TC 118SD	£89.95
TC 135SD	£107.95
TC 136SD	£129.95
TC 186SD	£124.95
TC 204SD	£143.95
TC 177SD	£353.50
+ other models (please ring for competitive prices)	

THORENS

TD 160C Mk.II	£87.50
TD 160BC Mk.II	£71.50
TD 160BC Mk.II/SME 3009	£109.00



Linton 2 Kit (pair)	£21.90
Denton 2XP pr.	£42.50
Kit for above pr.	£22.90
Linton 3XP pr.	£59.90
Kit for above pr.	£34.90
Glendale 3XP pr.	£79.90
Kit for above pr.	£46.80
Dovedale 3 Kit (pair)	£60.50

CARRIAGE & INSURANCE

Charges per item

Amplifiers, Tuners, Receivers, Cassette Decks and Speaker Kits, £2.75. Turntables, £1.95. Speaker Systems (per pair), Tape Recorders and Decks, £3.75. Headphones, 65p.

SPECIAL MONEY SAVERS

AIWA EAGLE FONS JBL NATIONAL PANASONIC	AX7500 Receiver£169.90 AA2 Amplifier£39.95 AA4 Amplifier£55.95 AA8 AM/FM Tuner£58.95 CQ30 MkII/SME 3009£125.00 L16 Speakers (pair)£169.94 S109 Aquarius (pair)£191.24 RS269 Cassette Deck£79.95
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Carriage and Insurance as for individual items stated elsewhere in this advert.

THE KJ 4 STAR PURCHASE PLAN

- * **Extended parts and labour service guarantees:**
3 years on Amplifiers, Tuners and Receivers.
2 years on Turntables, Cassette decks and Tape equipment.
5 years on Speaker systems.
- * **Part exchange guarantee**—KJ will take back any major equipment previously purchased from us provided you repurchase under the 4 star plan.
- * **Free insurance** against all risks on equipment bought from us for a period of one year following purchase.
- * **7 day exchange on purchases** of major hi-fi equipment.

THE KJ BUDGET PLAN

Alternatively, for customers wanting to keep their initial investment as low as possible KJ offer very keen prices with a minimum 12 months parts and labour guarantee (longer if specified by the manufacturer).

PRICES —

all prices quoted in this advertisement are based on the KJ Budget Plan and include VAT. Obviously 4 star purchase plan prices reflect the extra services included and customers are asked to enquire at their nearest branch for further details. Prices were correct at date of going to press (31/10/76). Special offers are subject to being unsold.



SEND BY MAIL —

adding any relevant postage and packing charges and enclosing cash with order or simply quote your Access or Barclaycard number. Post to: KJ Leisure Sound Ltd., Dept. HP12, Bridge Path, Watford, Herts. WD2 4BZ.

TELEPHONE ORDERS

can be accepted where payment is made by Access or Barclaycard—Simply telephone our order desk on **WATFORD 45248**

CATALOGUE

The new 24-page KJ catalogue is now published each month. Packed full with information, special offers and a monthly newsletter to keep you up to date with new products. You can get a copy from any of our branches or if you are unable to call send for a copy enclosing 10p for postage to KJ Leisure Sound Ltd., Bridge Path, Watford, Herts WD2 4BZ or it's **FREE** with orders.

INSTANT CREDIT

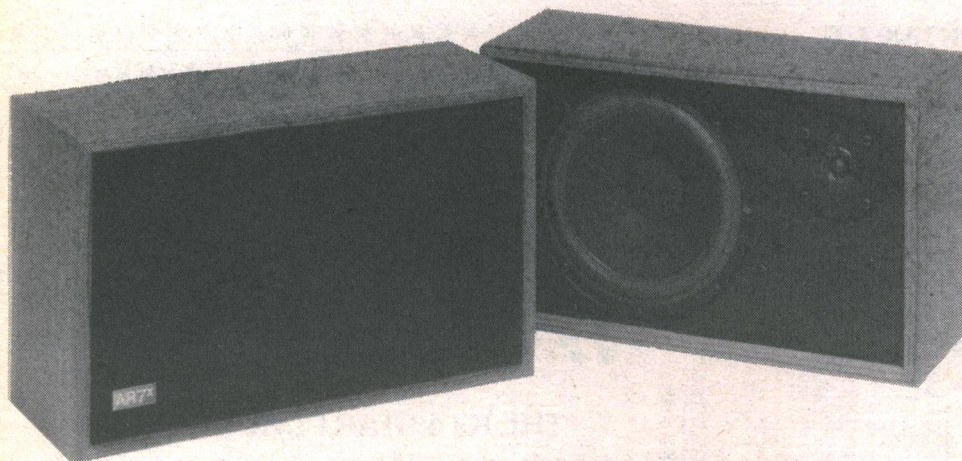
now possible with low deposit easy repayment terms on the U.K. mainland only.

EXPORT —

can be arranged but prices in this advertisement do not apply to orders from outside the U.K. Please write for quotation.

The AR-7x

AR Announce a new development on their most popular speaker—the AR-7.



In the four years since it was first introduced, the AR-7 has established itself as probably the most accurate compact speaker available. Hundreds of thousands of music lovers all over the world, recognising the unusual merits of this deceptively small system, became proud owners.

It isn't easy to improve on such a fine speaker. AR engineers have, nevertheless, developed in the new AR-7x a system that is measurably and audibly better.

As with the other speakers in the Advanced Development Division Range, the AR-7x uses an acoustically transparent foam grill.

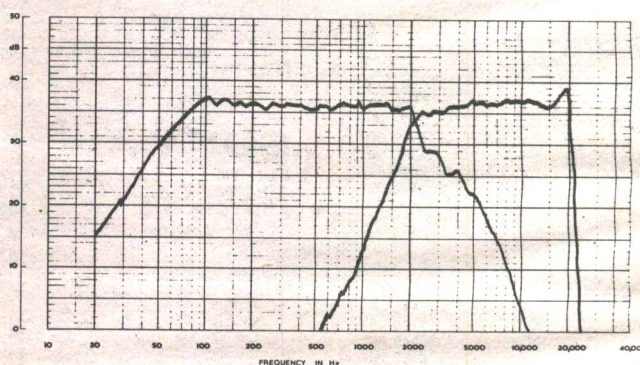
With dimensions of only (247 x 400 x 156 mm deep), the AR-7x can be mounted or placed practically anywhere. The quality of sound is not reflected by its modest size and price.



HIGH RANGE UNIT WITH MAGNETIC FLUID DAMPING

The 1½" (38mm) tweeter now incorporates magnetic fluid and a larger magnet. This provides about 2½ dB more high frequency output as well as significantly better power handling. Combined with improved woofer design, a loudspeaker of even greater accuracy than before is the result.

AR's newly printed Guide to Loudspeakers, a 36 page colour booklet, describes the entire new Advance Development Division Range of speakers plus a great deal of useful information on speaker design, manufacture, room placement, selecting associated equipment, and much else.



AR-7x ON AXIS RESPONSE OF SEPARATE DRIVERS THROUGH CROSSOVER

- ☐ Please send details on AR loudspeaker systems.
- ☐ Please send the 'AR Guide to loudspeakers'. (Available at a cost of 20p.).

Name

Address



TELEDYNE ACOUSTIC RESEARCH
High Street, Houghton Regis,
Dunstable, Beds. LU5 5QJ, England

Stereo speakers should adjust to the shape of your room. Not vice versa.

To obtain a good sound balance from most speakers you have to move the room around.

Or else you shift your speakers around.

You may even have to do both.

This is not the case with the unique Bose 301 speaker

With the 301, you alter the sound balance to suit the shape of your room. Simply by adjusting a control on top of the speaker cabinet.

If you move house, or move your furniture, you simply move the control a little.

The 301 operates on the reflected sound principle. However, instead of reflecting

sound off walls it reflects the sound off a paddle within the speakers.

When you turn the control on top of the speaker, you vary the angle of the paddle.

Which varies the sound balance.

Which gives you a fantastic quality of sound.

It also, incidentally, makes it probably the most sophisticated bookcase speaker you can buy.

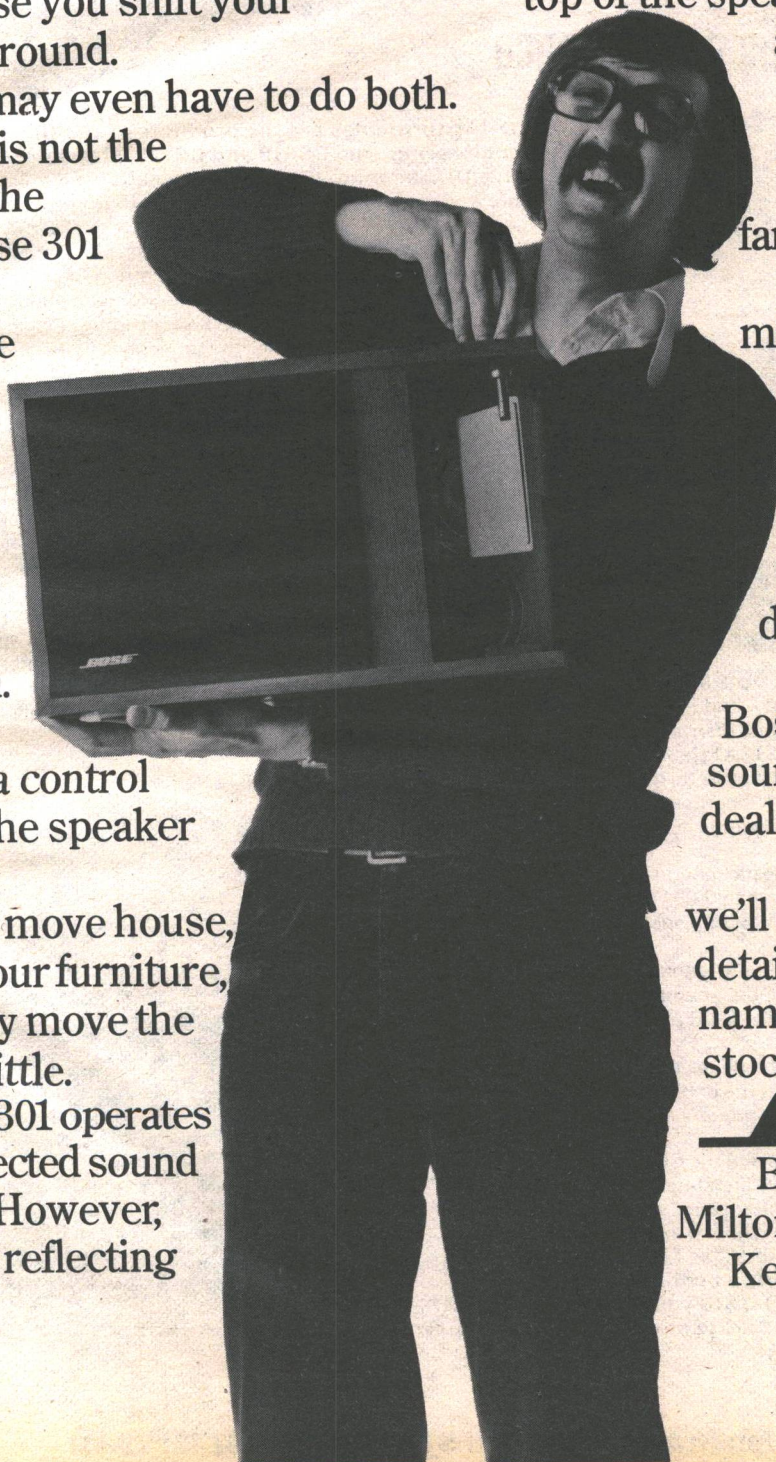
And for around £150 a pair, you could do an awful lot worse.

You can test the Bose 301, with its unique sound paddle, at any Bose dealer.

Contact us now and we'll let you have further details, together with the name of your nearest stockist.

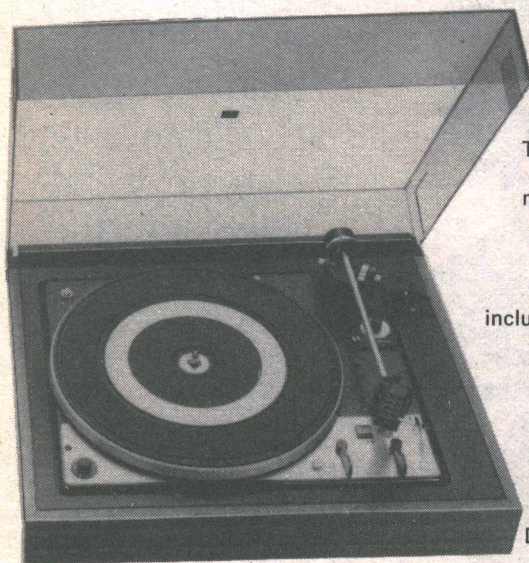
BOSE®

Bose (UK) Limited,
Milton Regis, Sittingbourne,
Kent. Tel: 0795 75341.



Dual FIRST FOR TECHNICAL PERFECTION

— Effortless, automatic performance



ALL DUAL turntables are the products of the finest technology and precision engineering. The CS510 and CS1225/1 are prime examples from the extensive DUAL range. Whichever you choose you can be certain you have a durable and reliable turntable which will give you the high standard of performance you demand.

TAKE THE CS510. It's a medium priced manual, single-play turntable which positively demonstrates DUAL technology throughout. Forgetting the whys and wherefores of manual v automatic there is just that touch of the automatic about the 510 where you need it. A mechanical sensor tells you when the tonearm is lined up precisely over the lead-in groove. When the record finishes the tonearm is lifted by cue-control and the motor shuts off... automatically.

The CS510 is belt driven. A simple system which filters out motor vibration. Features include: 8-pole synchronous motor. 12" dynamically balanced 2 speed platter with inbuilt gear cut strobe. Viscous-damped cue-control. Pitch control. Multi-scale anti-skate. Low mass gimbal tonearm and Shure M95D cartridge. Weighted rumble according to DIN 45 500 is better than -63dB. Wow and flutter is better than 0.08% according to DIN 45 507. All in all a turntable for every season. Just what you'd expect from DUAL. Technical perfection and precision performance.

The CS1225/1 is an economically priced turntable for universal use as a manual, fully-automatic or changer. The rim-drive system performs precisely and reliably for a constant high standard which makes this model one of the most popular in the DUAL range. The CS1225/1 has a single phase 4-pole induction motor and a die-cast platter. The tonearm is of torsion resistant tubular aluminium fitted with Shure

M75D cartridge and mounted in a self-adjusting pivot bearing. Other features include: pitch control; anti-skating and cue-control. Wow and flutter is better than $\pm 0.12\%$. Rumble is better than -57 dB weighted.

A competitively priced performer which more than meets the demands of most hi-fi enthusiasts.

AND TO COMPLETE YOUR HI-FI SYSTEM the C901 cassette Unit.

The 901 is a revolutionary new 4 track tape cassette deck for recording and playback in both directions. This new deck incorporates the finest in modern engineering techniques with the noise reducing circuitry developed by Dolby laboratories.

The continuous pole motor has radially elastic mounts which ensure outstanding speed stability. Wow and flutter are better than 0.09 W.R.M.S. The Dolby noise suppression system with which the 901 is fitted gives a signal to noise ratio of more than 60dB.

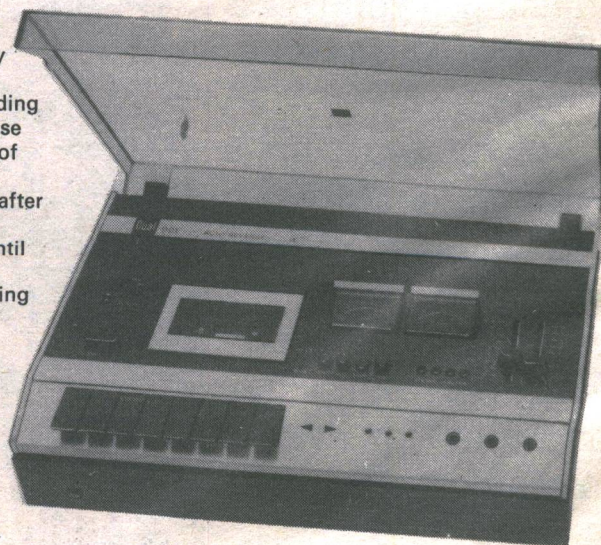
Features include: an auto reverse which changes the direction of a cassette after playing it in one direction, giving many hours of uninterrupted listening. A continuous play key which allows the recorder to play back and forwards until the stop or eject key is depressed.

A photo-electric resistor, which monitors tape payout to prevent loops forming and initiates the auto reverse or shut off at the end of the tape.

In short, a high quality stereo cassette deck offering maximum operating convenience.

Find out more about these two turntables and the C901 at your local DUAL stockist. You will find plenty of informative literature and be given a demonstration. If you are not sure who your nearest stockist is you can always write direct to us. By the way, the whole DUAL range — there are other models not shown here — starts at less than £90.00.

DUAL have 75 years of technical achievement behind them. Achievements which are made available to you in everything DUAL produces. So visit your stockist and take your choice from the finest audio components available today.



Sales enquiries to:

A. C. Farnell Ltd Kenyon Street, Sheffield S1 4BD Tel: (0742) 78901

HI-FI PRICES

A guide to current Hi-Fi equipment recommended retail prices. All exclude VAT.

Loudspeakers

Key: Number of drive units; power output rating; impedance; *amplifier power rating

ACOUSTIC RESEARCH

AR-10	3	25-150W*	4-16	pr	£388.00
AR-11	3	25-150W*		pr	£297.00
AR-12	3	15-100W*	8Ω	pr	£238.00
AR-14	2	15-100W*	8Ω	pr	£177.00
AR-16	2	15-100W*		pr	£117.00
AR-7x	2	up to 100W*	8Ω	pr	£74.00

AIWA

SC25	2	30W	8Ω	pr	£58.49
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AKAI

SA800	2	30W	8Ω		£107.56
SA1000	3	50W	8Ω		£184.00
SA1200	3	60W	8Ω		£229.33

RICHARD ALLAN

RA8	2	20W	8-22-5Ω	pr	£63.00
RA82	2	45W	5-20Ω	pr	£101.00
RA82L	2	45W	5-20Ω	pr	£121.00
Minette II	2	10W	8/15Ω	pr	£41.00
Chaconne II	2	12W	8/15Ω	pr	£50.00
Flamenco II	3	15W	8/15Ω	pr	£71.50
Pavane	3	20W	8/15Ω	pr	£100.00
Sardana	3	25W	8/15Ω	pr	£116.00
Academy	3	35W	8/15Ω	pr	£188.00
RA 828LP	3	45W	8Ω	pr	£189.00
Maramba	3	20W	8Ω	bd	£79.00

ALPHA

HT12	1	10W	8Ω		£16.00
HT20 Mk3	3	35W	8Ω		£39.00
HT50 Mk2	2	25W	8Ω		£24.00
HT60 Mk2	4	60W	8Ω		£49.00
HT90	3	45W	8Ω		£69.00

ALTEC LANSING

Model One	2	30W	8Ω		£72.00
Model Three	2	35W	8Ω		£95.00
Model Five	3	45W	8Ω		£149.00
Model Seven	3	50W	8Ω		£189.00
Model Nine	3	60W	8Ω		£249.00
Stonehenge 2	3	50W	8Ω		£295.00
Santana 2	2	45W	8Ω		£199.00

AMCRON

ES-212	2	75W			£440.00
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AMSTRAD

1500	2	15W	8Ω	pr	£40.68
2500	2	25W	8Ω	pr	£45.87

AUDIOMASTER

Image 2	2	15-50W	15Ω	pr	£97.68
LS3/5A	2	25-50W	15Ω	pr	£124.35

BANG & OLUFSEN

Beovox S30	2	30W	4-8Ω	pr	£79.60
Beovox P30	2	30W	4-8Ω	pr	£89.20
Beovox S45	3	45W	4-8Ω	pr	£119.60
Beovox P45	3	45W	4-8Ω	pr	£127.60
Beovox S60	4	60W	4-8Ω	pr	£162.80
Beovox M70	4	70W	4-8Ω	pr	£236.40
S22	2	22W RMS	4Ω	pr	£72.00

BOSE

301	2	60W	8Ω	pr	£136.00
501	3	100W	4Ω	pr	£215.00
901	9	100W		pr	£375.00

B & W

D5	2	25W	8Ω		£33.70
DM4	3	30W	8Ω		£55.68
DM2A	3	60W	8Ω		£78.12
DM6	3	350W	8Ω		£167.86
DM70 Improved	2	100W	8Ω		£223.19

CAMBRIDGE AUDIO

R40	3	80W	8Ω		£109.00
R50	4	100W	8Ω		£142.00

CASTLE ACOUSTICS

Richmond	2	25W	4-8Ω	pr	£68.00
Kendal	2	35W	4-8Ω	pr	£95.00
Conway	3	50W	4-8Ω	pr	£140.00
Howard	5	50W	4-8Ω	pr	£182.00

CELEF

Micro	2	20-50W*	8Ω	pr	£85.00
Mini	2	20-50W*	8Ω	pr	£93.00
Monitor	2	20-60W*	8Ω	pr	£130.00
Domestic	2	10-100W*	8Ω	pr	£80.00

Mini

Professional Studio	2	25-80W*	8Ω	pr	£165.00
Professional	3	25-100W*	8Ω	pr	£360.00

CELESTION

UL6	3	20-40W	4-8Ω	pr	£104.06
UL8	3	15-50W	4-8Ω	pr	£128.30
UL10	3	25-100W	4-8Ω	pr	£197.12
Ditton 11	2	15-30W	4-8Ω	pr	£69.30
Ditton 15	2	10-30W	4-8Ω	pr	£110.36
Ditton 33	3	20-50W	4-8Ω	pr	£169.40
Ditton 44	3	20-50W	4-8Ω	pr	£201.84
Ditton 25	4	15-60W	4-8Ω	pr	£233.36
Ditton 66	3	20-80W	4-8Ω	pr	£332.96

CHARTWELL

LS3/5A	2	25W	15Ω		£62.50
PM200	2	50W	8Ω		£74.50
PM400	3	100W	8Ω		£128.50

DALESFORD

DS1	2	50W	8Ω	pr	£94.80
DS2	3	60W	8Ω	pr	£140.98
DS3	2		8Ω	pr	£147.75
DS4	3		8Ω	pr	£195.00
DS5	3		8Ω	pr	£252.00

DANSK

HT-25	2	30W	4Ω		£19.91
A-10	2	30W	4Ω		£28.45
A-20	2	35W	4Ω		£32.00
A-25	2	45W	4Ω		£39.11
A-30	2	50W	4Ω		£44.45

DYNACO

A10	2	50W	8Ω	pr	£47.95
A25	2	60W	8Ω	pr	£71.95
A35	2	60W	8Ω	pr	£95.95
A50	3	100W	8Ω	pr	£159.95

DYNASTATIC

Compact		35W	8Ω	pr	£118.00
AS1		35W	8Ω	pr	£150.00
AS200	4	90W	8Ω	pr	£300.00

DYNATRON

LS1018	1	15W	8Ω		£15.28
LS1428	2	50W	8Ω		£28.00
LS3038	3	50W	8Ω		£38.00
LS4138	3	50W	8Ω		£65.74
LS2928	2	50W	8Ω		£62.40
LS3138	3	50W	8Ω		£94.00
LS5128	2	50W	8Ω		£62.00
LS5228	2	50W	8Ω		£60.00

EAGLE

S2002	2	10-15W	8Ω	pr	£42.00
S2003	3	10-15W	8Ω	pr	£56.00
S2004	3	20W	8Ω		£34.00
S2005	3	25W	8Ω		£59.00
S2006	3	35W	8Ω		£79.00

EDWARDUS

LS150	2	20W	8Ω	pr	£30.00
LS200	2	20W	8Ω	pr	£33.00
LS250	3	25W	8Ω	pr	£42.00
LS400	3	40W	8Ω	pr	£78.00
TD151	2	20W	8Ω	pr	£42.60
TD201	2	20W	8Ω	pr	£48.60
TD251	3	25W	8Ω	pr	£57.60
TD401	3	40W	8Ω	pr	£93.60
ME2	3		8Ω	pr	£90.00
ME4	3		8Ω	pr	£135.00

ESS

AMT-1	2	20W	4Ω		£189.60
AMT-1 Tower	2	20W	4Ω		£222.40
AMT-3	4	20W	4Ω		£254.40
AMT-4	2	20W	4Ω		£152.80
AMT-5	2	15W	4Ω		£111.20
AMT-6	6	50W	6Ω		£416.00

EXECUTIVE AUDIO

Hi-Ball 750	1	45W	8Ω	pr	£36.00
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FARNELL-KF

Opus 20	1	15W	8Ω	pr	£39.64
Opus 45	3	35W	8Ω	pr	£71.88
Opus 55	3	40W	8Ω	pr	£103.72

FERROGRAPH

SI	3	100W	8Ω		£114.00
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FISHER

MS-10		15W		pr	£37.50
XP-55-S	2	40W	8Ω	pr	£74.00
XP-56-S	2	50W	8Ω	pr	£92.00
XP-65-S	3	65W	8Ω	pr	£118.00
XP-7-S	3	90W	8Ω	pr	£136.00
ST-425	2	100W	6-8Ω	pr	£126.00
ST-455	3	150W	6-8Ω	pr	£156.00
ST-465	3	200W	6-8Ω	pr	£244.00

GALE

GS401A	4	25-100W	4-8Ω		£130.00
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GOODMANS

Minister SL	2	40W	8Ω		£29.06
Havant SL	3	40W	8Ω		£35.87
Mezzo SL	2	60W	8Ω		£53.13
Goodwood	3	60W	8Ω		£60.50
Magnum SL	3	60W	8Ω		£66.90
Dimension 8	9	120W	8Ω		£85.66
Achromat 100	2	50W	8Ω		£44.98
Achromat 250	2	60W	8Ω		£66.06
Achromat 400	3	75W	8Ω		£87.01

GRIFFIN

15	2	20W	8Ω	pr	£53.53
25	3	25W	8Ω	pr	£92.45
27	3	35W	8Ω	pr	£128.25
85	5	65W	8Ω	pr	£455.80

HACKER

LS250	2	20W	8Ω	pr	£47.00
LS550	2	30W	8Ω	pr	£58.00
LS1100	3	60W	8Ω	pr	£78.00
LS1300	3	70W	8Ω	pr	£126.00

HITACHI

HS 300	2	50W M	8Ω		p.o.a.
HS 335	3	50W	8Ω		p.o.a.
SS 83109	3	10-40W	4Ω		p.o.a.

IMF

Compact II	2	40W	4-8Ω		£69.50
Super Compact	3	50W	4-8Ω		£103.95
ALS4011	4	60W	4-8Ω		£214.50
TLS5011	4	70W	4-8Ω		£248.00
TLS80	4	80W	4-8Ω	pr	£355.00

Professional Monitor MkIV

	4	50-150W*	4-8Ω	pr	£635.00
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ISOPHON

SKB 5030/8	2	30W	8Ω	pr	£62.00
B 25/8	2	20W	8Ω	pr	£50.00
B 60/8	3	40W	8Ω	pr	£99.00

JBL

Decade L16	2	35W	8Ω		£99.00
Decade L26	2	35W	8Ω		£149.00
Decade L36	3	50W	8Ω		£195.00
Century L100	3	50W	8Ω		£279



Ferrograph Mark II

Stereo Tuner SFM1 Mk II is of advanced design and has a high sensitivity. An unusual feature is a Separation control, continuously adjustable from full stereo to mono, which permits a reduction of noise level to be obtained in difficult reception areas.

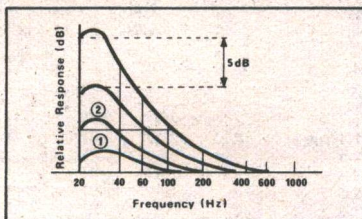
It also has meters for signal strength and for precise tuning, on/off switches for automatic frequency control and for muting circuits, and a variable muting threshold control. In addition to the usual frequency scale, a linear station-logging scale is provided.

Amplifier F608 Mk II has the reserves of power required to drive modern low-efficiency speakers fully. It is rated to give a continuous sixty watts of sinewave power per channel and will handle transient peaks of power well in excess of 200 watts.

Distortion is extremely small at all output levels. An important characteristic is that the bass controls are not centred on 1000Hz (see curves). This allows bass boost to be used for equalising

loud speaker response without introducing coloration. For example, curves 1 and 2 would compensate accurately for the i.f. fall-off of monitor speakers and the smaller bookshelf speakers, respectively.

Comprehensive input and output arrangements cater for the connection of two tape recorders, allowing



transcription with filters in either the Record or Play channels, and direct A/B comparisons of recorded sound against incoming signal.

Amplifier F208 Mk II (not illustrated) is a high quality product with

a number of important features: connections for ceramic and magnetic pick-ups (with switched matching), filters at 5, 7 and 10kHz, adjustable sensitivity tape connections with A/B comparison switching, and a front-panel stereo headphones socket.

Tone controls are dual concentric, the bass characteristics being the same as for the F608 (see above). Power rating is 20 watts continuous sinewave per channel, with a capacity for handling transient peaks in excess of 75 watts.

Please send me further information on:
SFM1 Mk II F608 Mk II
F208 Mk II

Wilmot Breeden Electronics Limited,
Durban Road, South Bersted,
Bognor Regis, West Sussex.
PO22 9RL.

Name _____

Address _____

HFP



Wilmot Breeden Electronics Limited

Ferrograph

Rendar

Wayne Kerr

Durban Road, South Bersted, Bognor Regis, West Sussex. PO22 9RL.
Telephone: Bognor Regis 25811 (STD Code 02433)

A guide to current Hi-Fi equipment recommended retail prices. All exclude VAT.

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Look in and listen to SONY

Sony, the name the Hi-Fi enthusiast has come to regard as synonymous with high quality equipment, superbly styled and utterly reliable. We at Kumar Hi-Fi have an entire luxurious showroom solely devoted to the full range of Sony equipment. Illustrated on this page are but a few of the models we have in stock. Pay us a visit sometime, we'll be delighted to demonstrate the very latest sounds from Sony, the name you can trust.

SS5050 Loudspeaker System

A three unit system of infinite baffle construction featuring Sony's new carbon fibre cones. Superb transparent sound with low colouration. Capable of handling a massive 80 watts per channel.

TC 756-2 Semi-Professional Stereo Tape Deck

A tape deck for the connoisseur. Introduces the studio tape speed of 15 ips to the Sony range besides the usual 7½ips. Has a whole host of features including 3 heads which permit off-tape monitoring.

TA 5650 V-Fet Integrated Stereo Amplifier

Has to be heard to be believed. Thanks to the V-FET, a vertical construction field effect transistor developed by SONY engineers, this amplifier offers a transparency and smoothness of sound not previously associated with solid state equipment.

ST4950 Stereo Tuner

An ideal companion to the TA5650 Amplifier. Features both FM and AM. Unique LED tuning indicator for accurate tuning on VHF; illuminates when "on station."

TC209SD Dolby Stereo Front loading Cassette Deck

The very latest cassette deck featuring facilities for accepting not only ferric and chrome tapes but the newest ferric-chrome with their improved dynamic range. It is possible to make recordings on this machine barely distinguishable from the original.

PS6750 Stereo Turntable

Direct Drive "State of the art" turntable which is right at the forefront of turntable design. Ultra low resonance carbon fibre arm capable of accepting the very best cartridges available today.

All Sony equipment available on demonstration

All goods obtainable by Mail Order

KUMAR CAMERAS & HI-FI

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A guide to current Hi-Fi equipment recommended retail prices. All exclude VAT.

Key: S = stereo, M = mono, Q = quadraphonic,
 Ω = matching impedance

Record decks

Key: Speeds; B = belt drive, D = direct drive, I = idler drive. A = arm. C = cartridge.

ACOUSTIC RESEARCH			
AR-XB1	2sp	B A C	£71.00
ADC			
Accutrac 4000	2sp	D. A. C.	£255.20
AIWA			
AP 2060	2sp	B A	£70.30
AKAI			
AP003	2sp	B A C	£125.78
AMSTRAD			
TP12D	2sp	B A	£51.42
ARISTON			
RDII	2sp.	B. A.	£129.24
RDIIEL	2sp.	B. A.	£145.74
BANG & OLUFSEN			
1203	2sp	B A C	£71.92
2000	2sp	B A C	£92.72
3400	2sp	B A C	£111.60
4002	2sp	B A C	£238.80
6000	2sp	B A C	£311.60
BIC			
960	2sp.	B. A. C.	£94.50
980	2sp.	B. A. C.	£114.50
BSR			
BDS80	2sp.	B. A. C.	£50.96
BDS90	2sp.	B. A. C.	£56.14
BDS95	2sp	B. A. C.	£57.96
MP60	3sp.	A. C.	£39.43
CONNOISSEUR			
BD1	2sp.	B. (chassis only)	£18.20
BD2	2sp.	B. A.	£48.50
BD3	3sp.	B. A.	£85.00
DANSK			
1702	2sp	B A C	£115.57
DENON			
DP-3500	2sp	D	£162.30
DP-3700F	2sp	D A	£200.55
DUAL			
1229	2sp.	B. A. C.	£138.58
CS601	2sp.	B. A. C.	£124.30
CS701	2sp.	D. A. C.	£192.00
CS 1225/1	2sp	I. A. C.	£76.31

Is it the Ferguson price or the Dolby system that makes it so popular?



This Ferguson Stereo Cassette Deck (model 3280) explodes the myth that high quality equipment must be expensive to be any good.

As soon as you plug it into your system you'll see what we mean. You'll be able to make recordings in stereo or mono and also play pre-recorded cassettes.

The famous Dolby[®] Noise Reduction System isn't the only feature that will help you. The two record level meters are illuminated so they're easy to keep an eye on and indicator lights show when the Dolby System, Chrome Tape, ALC, record and microphone are in use.

If you prefer to operate the record levels manually rather than leave it to be done automatically, you can use the professional type slider controls.

But the main controls are the piano key type.

These operate stop, rewind, fast forward, pause, play, eject and record. A push button resets the tape position indicator.


There's also a switch for chrome tape that alters bias and equalisation, and there is an Auto-Stop function.

As optional extras you can buy stereo headphones to monitor your recordings, and also an appropriate stereo microphone.

Of course not all Ferguson Stereo Cassette Decks include the Dolby System.

But like model 3279 shown below they do share one major feature.

Every one of them is excellent value for money.

*Copyright of Dolby Laboratories Inc.  DOLBY SYSTEM

Introduce your family to ours.



HI-FI PRICES

A guide to current Hi-Fi equipment recommended retail prices. All exclude VAT.

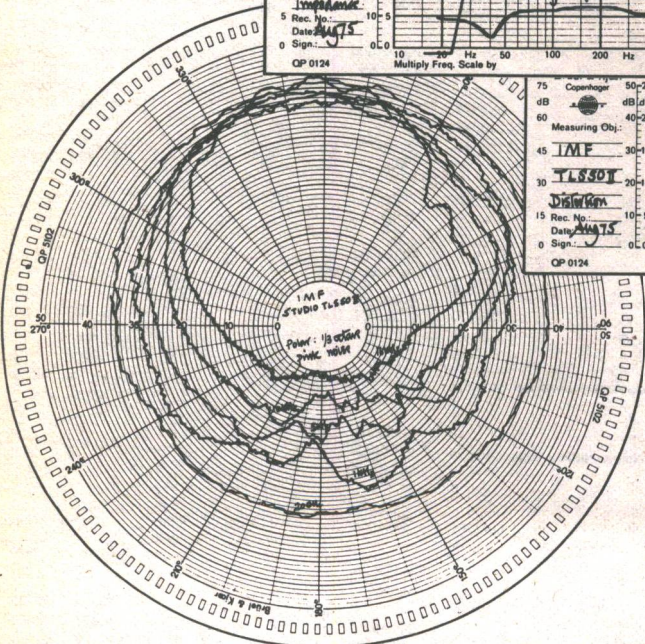
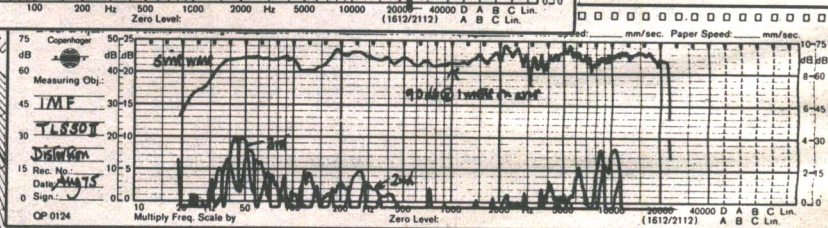
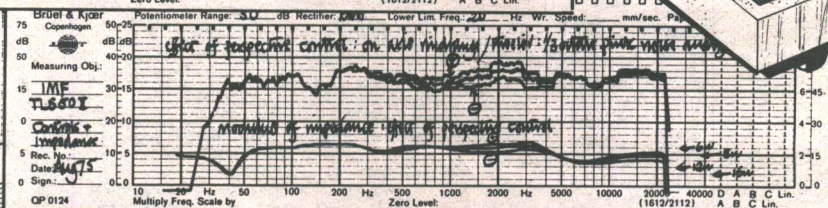
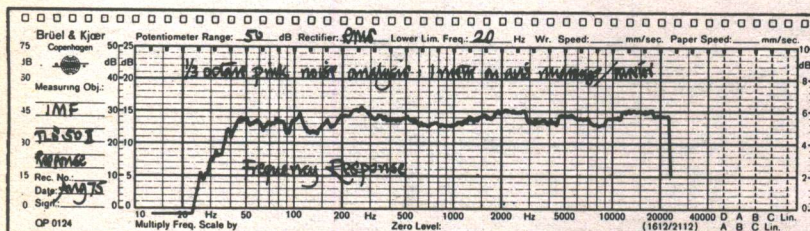
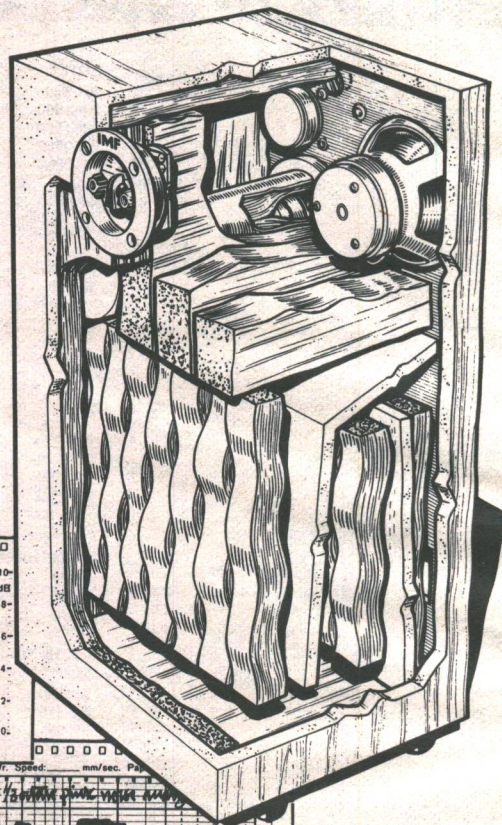
DUAL CS 721 CS 704	2sp D. A. C. 2sp D. A. C.	£221.64 £165.66	ROTEL RP-900 RP-1500 RP-1500 RP-3000 RP-3000	2sp B A 2sp B 2sp B A 2sp D 2sp D A	£71.02 £66.22 £81.33 £110.67 £133.24	CAMBRIDGE AUDIO T55	S.	FM	£119.00	
EAGLE D2005 D2006	2sp. B. A. 2sp. B. A.	£51.90 £88.00	SANSUI SR-222P SR525P	2sp B. A. 2sp D A	£76.30 £145.81	MARANTZ 112 125 150	S S S	FM/MW FM/MW FM/MW	£145.00 £216.00 £330.00	
EMPIRE 598111 69811	2sp. B. A. 2sp B. A.	£199.00 £289.00	SANYO TP625 TP700SA	2sp. B. A. C. 2sp. B. A. C.	£59.95 £74.75	EAGLE T2008 AA8 AA102	S. S. S	FM/MW FM/MW FM/MW	£75.00 £84.00 £47.20	
ERA Mk6X 444	2sp B 2sp B A	£65.00 £69.95	SONAB 65S 67S 85S	2sp. B. A. C. 2sp B A C 2sp. B. A. C.	£74.03 £74.03 £74.03	FERROGRAPH SFM1 Mk2	S	FM	£114.00	
FONS CQ30	3sp B	£92.50	SONY PS1350 PS2350 PS4750 PS6750	2sp B A C 2sp B A C 2sp D A 2sp D A	£69.29 £75.51 £122.62 £151.06	HARMAN-KARDON Citation 15	S.	FM	£342.22	
FREELANCE PLASTIC FP2001	2sp D	£70.00	STRATHEARN STM4 STA4 SMA2	2sp D A C 2sp D A C 2sp D A	£79.95 £89.59 £149.38	HITACHI FT920 FT300	S S	FM/MW FM/MW	p.o.a. p.o.a.	
GALE GT2101	D A	£750.00	TECHNICS SL-1300 SL-120 SL-110 SL-20 SL23 SL1500 SL-400	2sp. D. A. 2sp. D. 2sp. D. 2sp. B. A. 2sp B A 2sp D A 2sp D A	£168.84 £124.40 £173.29 £53.29 £71.07 £106.62 £133.29	HOWLAND-WEST T1000	S	FM/MW	£48.00	
GARRARD 86SB 125SB SP25 MkIV	2sp. B. A. C. 2sp B A C 3sp. I. A. C.	£84.65 £61.50 £47.65	THORENS TD126C TD166C TD160C TD125AB MK2 TD145C	2sp A 2sp B A 2sp B A 3sp B A 2sp B A	£250.00 £95.00 £109.00 £165.00 £129.00	JVC JT-V310 JTV6	S. S	FM/MW FM/MW	£85.00 £118.00	
GOLDRING GL72 GL75 GL78 GL85 G102 L65	4sp. I. A. 4sp. I. A. 4sp. I. A. 2sp. B. A. 2sp. B. A. 2sp. B. A.	£48.00 £59.40 £79.50 £105.00 £42.00 £84.00	TOSHIBA SR-255 SR-300 SR-355 SR-370	2sp D. A. 2sp B A C 2sp D. A. 2sp D.	£101.77 £63.60 £113.33 £128.89	LECSON FM1	S	FM	£160.00	
HITACHI PS10 PS14 PS38	2sp B A 2sp B A C 2sp D A C	p.o.a. p.o.a. p.o.a.	TRIO KD-500 KD2033 KD5033	2sp D. 2sp. B. A. 2sp. D. A.	£155.55 £76.44 £145.78	LUX T33 T88V T110	S S S	FM/MW FM/MW FM	£125.00 £175.00 £295.00	
HARMAN-KARDON Rabco ST-7	2sp B A	£320.88	YAMAHA YP800 YP701 YP450 YP400	2sp. D. A. 2sp B A 2sp B A 2sp B A C	£222.00 £88.00 £79.91 £70.40	PHILIPS RH640	S	FM/MW/LW/SW	£76.00	
JVC JL-A1	2sp. B. A. C.	£62.13	ACCUPHASE T-101 T-100	S S	FM/MW FM/MW	£245.00 £350.00	PIONEER TX-5300 TX-7500 TX-9500	S. S. S.	FM/MW FM/MW FM/MW	£85.69 £168.37 £232.77
LEAK 3001	2sp B A	£116.52	ALBA UA800	S	FM/MW/LW	£55.96	QUAD FM3	S	FM	£85.00
LINN-SONDEK LP12	1sp B A	£156.00	ALPHA TX500 FT650 0007	S. S. S. S.	FM/MW FM/MW FM/MW FM	£63.50 £99.00 £49.50	REVOX A76	S.	FM	£267.00
LUX PD 131	2sp D	£220.00	AMSTRAD 3000 Mk11	S	FM/MW/LW	£50.00	ROGERS Panthera T75	S.	FM	£87.00
MARANTZ 6300 6320 6200 6100	2sp D A 2sp D 2sp B A 2sp B A	£196.50 £154.86 £155.75 £94.53	ARMSTRONG 623 624	S. S.	FM/MW/LW FM	£111.11 £87.11	ROTEL RT-224 RT-324 RT-624 RT-824 RT-1024	S. S. S. S. S.	FM/MW FM/MW FM/MW FM/MW FM/MW D	£71.02 £91.11 £133.24 £168.80 £288.89
MONITOR AUDIO Turntable	2sp. D. A.	£165.00	ATRON KT-1000	S	FM/MW	£63.00	SANSUI TU-3900 TU-9900	S. S	FM/MW FM/MW	£117.55 £318.15
PHILIPS GA209 GA212 GA227 GA418 GA427	2sp B A C 2sp B A C 2sp B A C 2sp B A C 2sp B A C	£132.00 £85.60 £44.80 £68.00 £52.00	BANG & OLUFSEN Beomaster 1700	S	FM	£71.60	SANYO FMT 200	S.	FM/MW	p.o.a. £63.95
PICKERING FA2 FA4	2sp. B. A. C. 2sp. B. A. C.	£138.00 £154.00	SONY ST70 ST88 ST2950F ST3950 ST4950 ST5130 ST5950	S. S. S. S. S. S.	FM/MW FM/MW FM/MW/LW/SW FM/MW FM/MW FM/MW	£53.29 £62.18 £88.84 £137.73 £151.07 £186.62 £204.40	J. E. SUGDEN R21 R51 T48	S S S	FM FM FM	£104.00 £104.00 £88.00
PIONEER PL-530 PL-510A PL-117D PL-115D PL-112D	2sp D A 2sp D A 2sp B A 2sp B A 2sp B A	£208.90 £141.96 £118.66 £80.02 £71.79	TECHNICS ST-3500 ST-7200 ST-7600 ST-9600	S. S S S	FM/MW FM/MW FM/MW FM/MW	£159.96 £74.62 £98.62 £231.07	REGA Planet Planar	2sp B A 2sp B A	£75.26 £77.27	

Tuners

Key: S = stereo

inside story . . .

As pioneers of the transmission line speaker and active line principle we attained international acclaim. The monitor TLS 80 heralded a new generation of IMF loudspeakers and immediately received unsurpassed praise from critics and audiophiles alike. The research that achieved such impeccable performance is now incorporated in the Studio TLS 50 II and ALS 40 II. Radically advanced loudspeakers — based upon our original design concepts.



IMF

studio loudspeakers

Westbourne Street, High Wycombe, Bucks. Telephone High Wycombe 35576

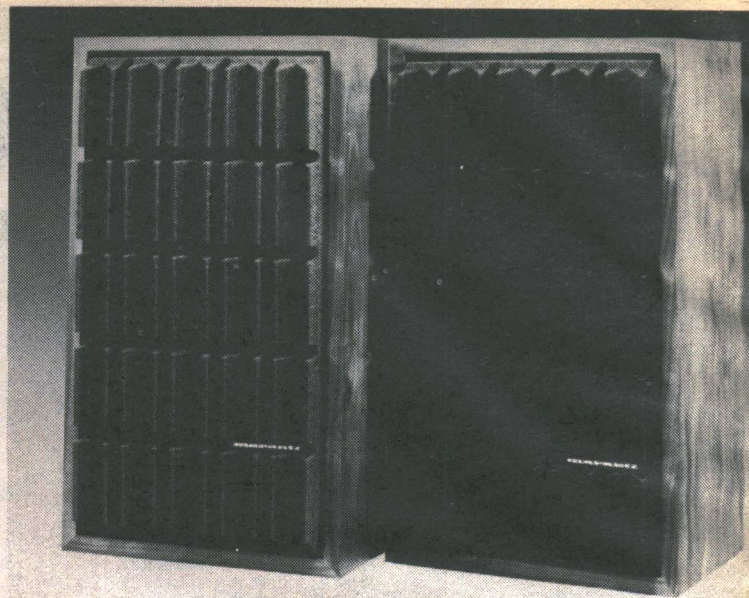
HI-FI PRICES

A guide to current Hi-Fi equipment recommended retail prices. All exclude VAT.

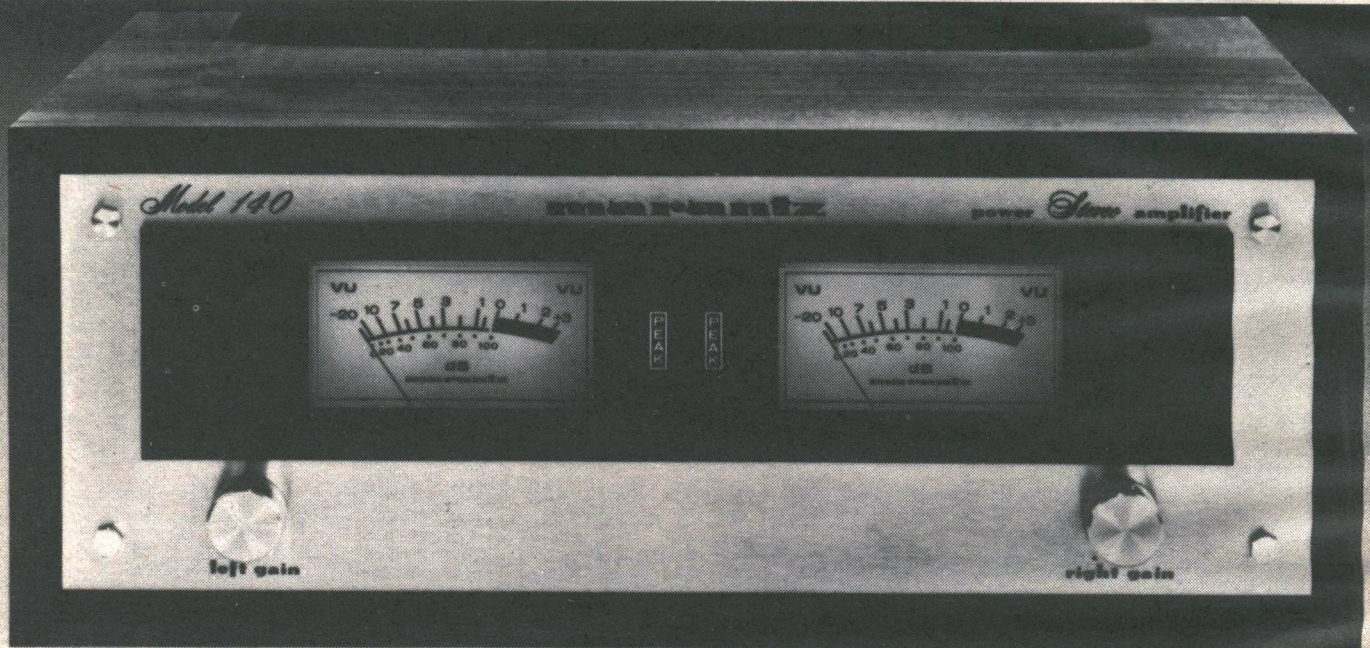
TELETON T300	S	FM/MW/LW	p.o.a.	FERROGRAPH F208 Mk2 F608 Mk2	S	20W	8Ω	£94.00	SA-7300	S	35W	8Ω	£144.55
TOSHIBA ST-910 ST-220	S	FM	£476.00	FISHER TX-55	S	60W	8Ω	£162.00	SA-7500	S	40W	8Ω	£211.68
TRIO KT1300 700T KT-5300 KT-7300 KT-8300	S	FM/MW	£84.00	GOODMANS Forty Forty	S	20W	8Ω	£82.00	SA-8500	S	60W	8Ω	£241.08
YAMAHA CT400 CT600 CT800 CT7000	S	FM/MW	£64.44	GRIFFIN T.O.C.	S	50W	8Ω	£90.13	SA-9500	S	80W	8Ω	£323.38
	S	FM/MW	£466.67	HARMAN-KARDON*	S	Preamp.		£152.27	SA-9900	S	110W	8Ω	£479.82
	S	FM/MW	£96.00	Citation 11	S	60W	8Ω	£321.77	Spec. 1	S	Preamp		£439.90
	S	FM/MW	£165.33	Citation 12	S	150W	8Ω	£241.77	Spec. 2	S	250W	8Ω	£589.78
	S	FM/MW	£244.44	Citation 16	S	20W	8Ω	£105.00	QUAD 33 303 405	S	45W	8Ω	£78.00
	S	FM	£533.20	A-401	S	150W	8Ω	£621.33	REVOX A78 Mk11 A722	S	100W	8Ω	£126.50
	S	FM		HITACHI HA610 HA300	S	60W	8Ω	£241.77		S	40W	8Ω	£229.00
	S	FM		HOWLAND-WEST A2000	S	150W	8Ω	£621.33		S	45W	8Ω	£205.00
	S	FM		JVC 4VN-550 4VN-880 4VN-990 JA-S310 JA-S8 JA-X9	S	20W	8Ω	£105.00	ROGERS Panthera A75	S	37.5W	8Ω	£95.00
	S	FM		LEAK*	S	50W	8Ω	p.o.a.	ROTEL* RA-212 RA-312 RA-412 RA-812 RA-1412 RA-1312	S	10W	8Ω	£65.33
	S	FM		2200 3900A	S	15W	8Ω	p.o.a.		S	18W	8Ω	£79.91
	S	FM		LECSON AC1 AP1 AP3	S	20W	8Ω	£63.00		S	25W	8Ω	£97.69
	S	FM		LUX*	S	20W	8Ω	£63.00		S	45W	8Ω	£171.11
	S	FM		L30 L80 L80V L100 M4000 M6000 C1000 M-2000	S	20W	8Ω	£63.00		S	110W	8Ω	£377.78
	S	FM		MARANTZ	S	20W	8Ω	£63.00		S	80W	8Ω	£288.89
	S	FM		1030 1040 1060 1070 1120 1200B 140 240 250 510 510M 4070 4140 3200 3600 3800	S	20W	8Ω	£63.00		S	80	8Ω	£432.81
	S	FM		NAD	S	20W	8Ω	£63.00		S	110W	8Ω	£532.69
	S	FM		60 90	S	20W	8Ω	£63.00		S	170W	8Ω	£712.48
	S	FM		NAIM	S	20W	8Ω	£63.00		S	Preamp		£513.72
	S	FM		NAP 120 NAC12 NAP160	S	20W	8Ω	£63.00		S	170W	8Ω	£563.31
	S	FM		ONLIFE	S	20W	8Ω	£63.00		S	300W	8Ω	£809.37
	S	FM		DV 3000 DV 8250 DV 8050	S	20W	8Ω	£63.00		S	22W	8Ω	£110.71
	S	FM		PHILIPS	S	20W	8Ω	£63.00		S	35W	8Ω	£134.16
	S	FM		RH551 RH521	S	20W	8Ω	£63.00		S	60W	8Ω	£204.40
	S	FM		PIONEER*	S	20W	8Ω	£63.00		S	90W	8Ω	£488.84
	S	FM		C3 M3 SA-5300 SA-6300	S	20W	8Ω	£63.00		S	15W	8Ω	£63.95
	S	FM		Valve preamp S Valve amp M Valve amp	S	20W	8Ω	£63.00		S	40W	8Ω	£133.84
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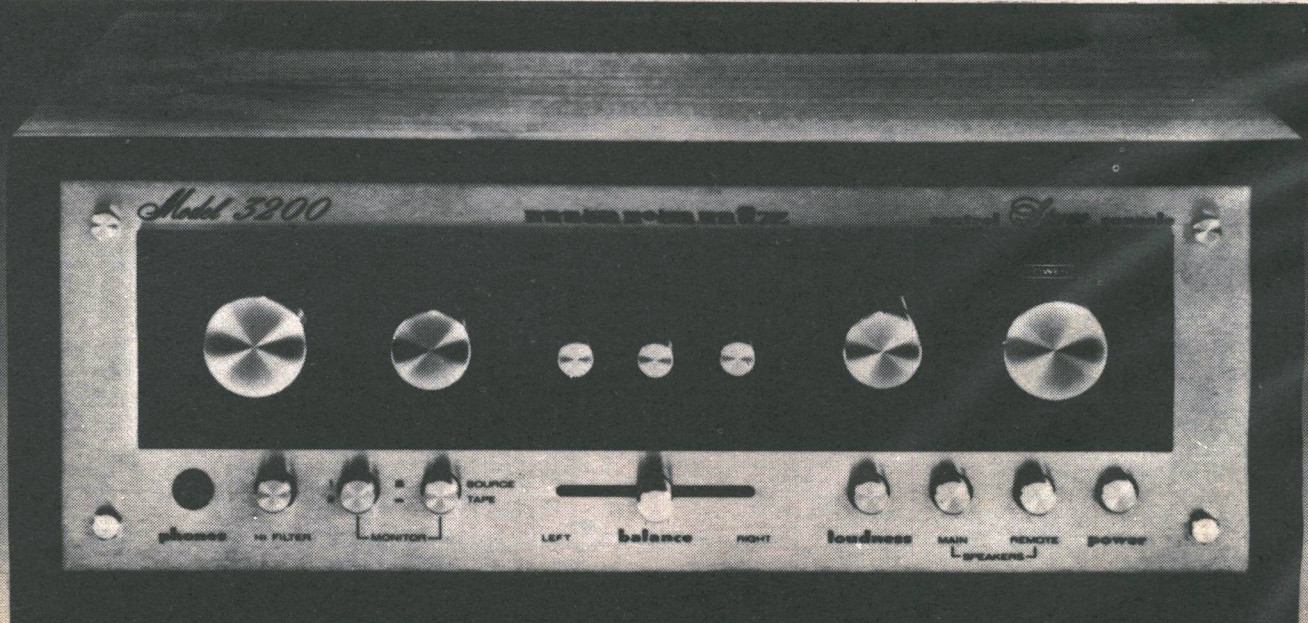
MODEL 5420 STEREO CASSETTE DECK
with mixing console, Ferrite heads, and Dolby Noise Reduction System



MODEL HD 55 THREE-WAY BOOKSHELF SPEAKER SYSTEM
with 8" woofer, 4 1/2" midrange, 1 1/2" LPF dome tweeter



MODEL 140 STEREO POWER AMPLIFIER



MODEL 3200 STEREO PREAMPLIFIER CONTROL CONSOLE

The Marantz 5 year guarantee.

This magazine is packed full of advertisements for Hi-Fi electronics. Many of them have famous names. If you've read them you'll know they're packed full of information. They contain enormous amounts of complex and often mystifying detail about the many magnificent features the purchaser would be acquiring when the product is bought.

Now we're not knocking any of this. Far from it. You have a right to know about the product before you part with your hard earned cash to buy it.

What, however, most of those ads don't talk about is ruggedness.

Sophistication is all very well.

But not if it interferes with reliability. It doesn't matter how many goodies you've got, if the basic machine doesn't function more than once in a while between repairs.

Just about now you should be going "Ho, hum

... Marantz are going to give us all that built like a tank routine."

And of course you're right. We are.

But with a twist.

We at Marantz are putting our money where our mouth is. We manufacture a range of seventy five separate pieces of Hi-fidelity electronic equipment.

Amplifiers. Tuner-amplifiers. Tuners. And cassette decks. They're generally acknowledged to be amongst the best in the world.

Gordon King of Hi Fi Sound, for example, said of our 4270 receiver, "Clearly, the Marantz 4270 four channel receiver is of a highly developed design. It is a design which looks encouragingly into the future."

But as they say 'sweet words never buttered spuds.'

So what we're going to do is give you a special guarantee. The Marantz 5 Year Guarantee.

Parts and labour of course.

Now we would like to ask you a small favour. Will you please thumb through this magazine and see how many other manufacturers have the same sort of faith in their products as we have in ours.

And when you've found how many there aren't, will you please fill in the coupon so we can send lots of literature and reviews and masses of the most intricate specification detail about the best Hi-Fi made today.

Ours.

marantz
We sound better.

☐ Please send me details on the

☐ Just send me brochures and price lists.

Name

Address

HFP12

Marantz (UK) Ltd
203 London Road, Staines, Middx.

Don't gamble with HiFi-
bank on Goodmans 50 years
of sound experience

the new RB range of loudspeakers



This new range of loudspeakers is the fruit of a long research and development programme to produce a system with high sensitivity *and* high power handling worthy of Goodmans reputation for the highest quality and value for money.

Employing specially developed long-throw bass drive units, efficient mid-range and high frequency units integrated with low loss networks the RB range—RB 18, RB 20 and RB 35—are certain winners.

Write for full technical specification of these new speakers and Goodmans range of associated high fidelity equipment.

Goodmans

Goodmans Loudspeakers Limited,
Downley Road, Havant, Hampshire,
PO9 2NL, England.

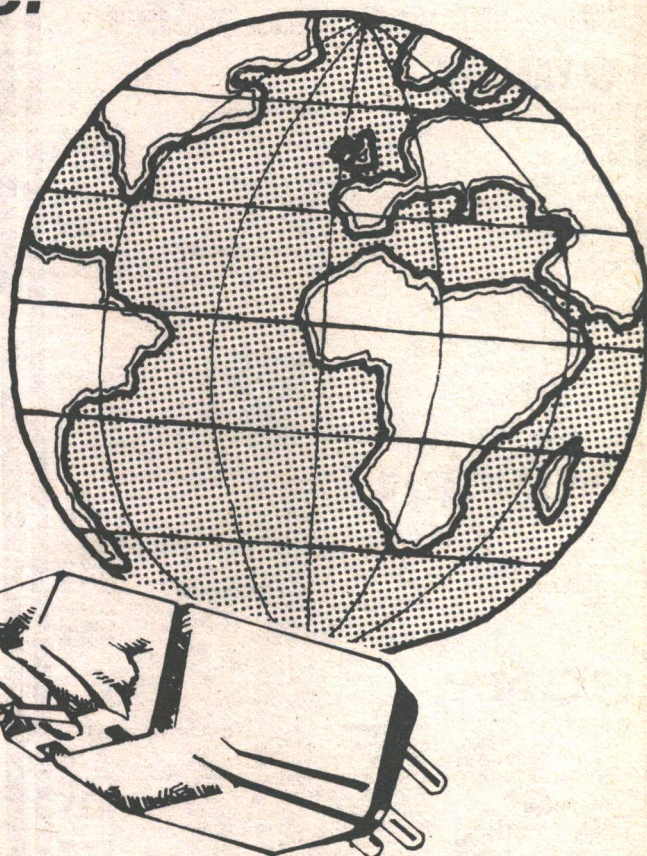
EMPIRE

**No matter how the specification adds up...
...it's the sound that really counts!**

***A really robust and subjectively
accurate cartridge.***

Over the last few months, the 2000E-III has gained a reputation in the Hi Fi press in many countries, for being musical, having a firm extended bass and a natural balance.

One way to prove this claim, is to carry out your own listening tests and any one of our dealers will be pleased to co-operate.



**OUR POPULAR PERFORMER
THE 2000E-III**

For a musical sound-try Empire

**CONSULT YOUR LOCAL DEALER TODAY FOR A
DEMONSTRATION OR SEND FOR THE BROCHURE**

Hayden Laboratories Ltd

HAYDEN

Churchfield Road,
Chalfont St. Peter, Bucks SL9 9EW
Tel: Gerrards Cross (02813) 88447

Please send me more details on Empire Cartridges

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Address

Code HFP II

THE NORTH EAST'S HI-FI HQ

Top Hi-Fi names, with Turners expert advice and Comparator facilities to take the doubt out of choosing. All in air conditioned comfort. Plus: keen pricing, great after sales service, our own workshops, an on-your-side attitude towards guarantees. Parking is handy, so come soon.



Technics

AMPLIFIERS					
SU7200	£79.95	SA5160	£149.95	RS273US	£152.95
SU7600	£106.95	SA5360	£194.95	RS640US	£182.95
SU3500	£199.95	SA5460	£289.95	RS630AUS	£137.95
SU8600	£259.95			RS671US	£199.95
TUNERS		TURNABLES		RS676US	£251.95
ST7200	£83.95	SL20	£59.95		
ST7600	£110.95	SL23	£79.95	SPEAKERS	
ST3500	£179.95	SL1500	£119.95	SB102EACH	£44.95
ST9600	£259.95	SL1400	£149.95	SB202EACH	£64.95
		SL1300	£189.95	SB402EACH	£104.95
		SL110	£194.95		
RECEIVERS		CASSETTE DECKS		NATIONAL MUSIC CENTRES	
SA5060	£109.95	RS263AUS	£109.95	IN STOCK	
SA5150	£125.95				



YAMAHA

TUNERS		AMPLIFIERS	
CT400	£109.80	CA400	£124.20
CT600	£149.40	CA600	£179.10
CT800	£199.80	CA800	£229.50
TURNABLES		RECEIVERS	
YP450	£74.70	CR200	£112.45
YP400	£79.20	CR400	£159.30
HEADPHONES		CR800	£299.70
HP2	£29.70	CASSETTE DECK	
HP1	£24.30	TC800	£199.90

QUAD

QUAD33 Control Unit
QUAD 303 Power Amp
QUAD 405 Power Amp
QUAD FM3 Tuner
QUAD Electrostatic SP

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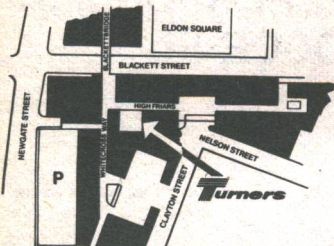
AR11 £334.12
AR12 £267.77
AR14 £199.12
AR16 £131.62
AR7X £83.25

PIONEER

AMPLIFIERS		TUNERS	
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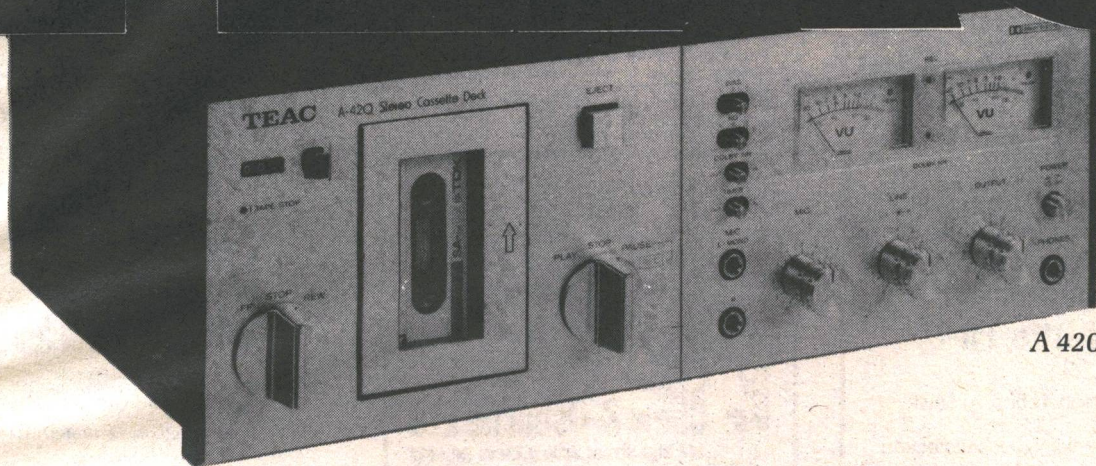
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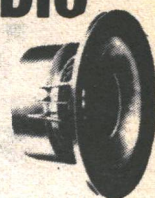
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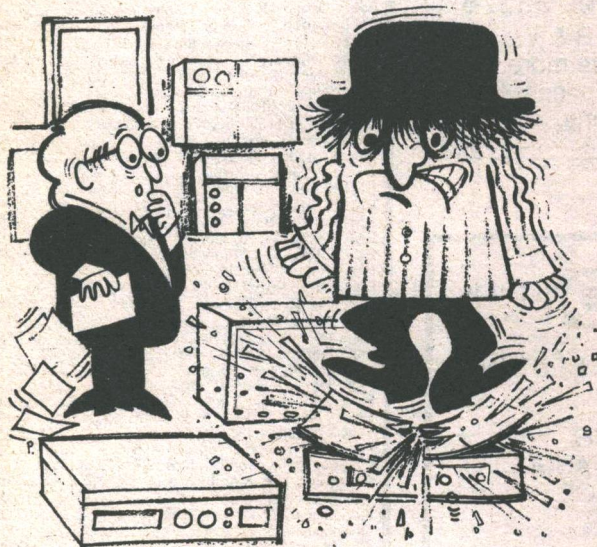
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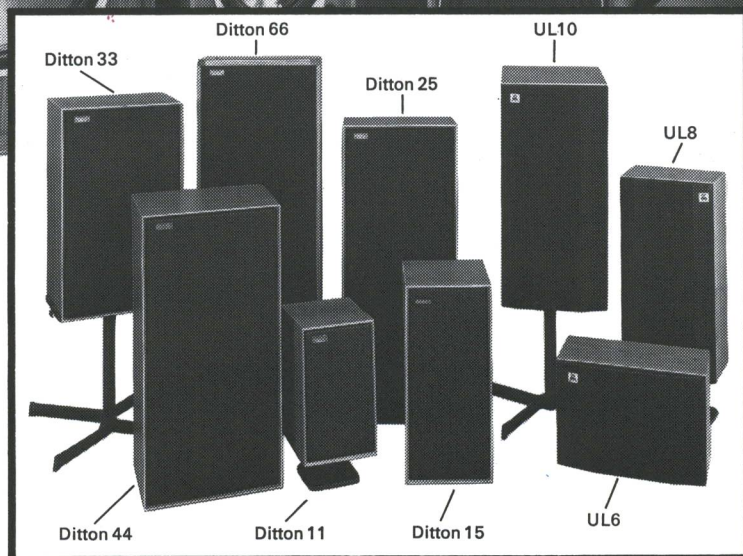
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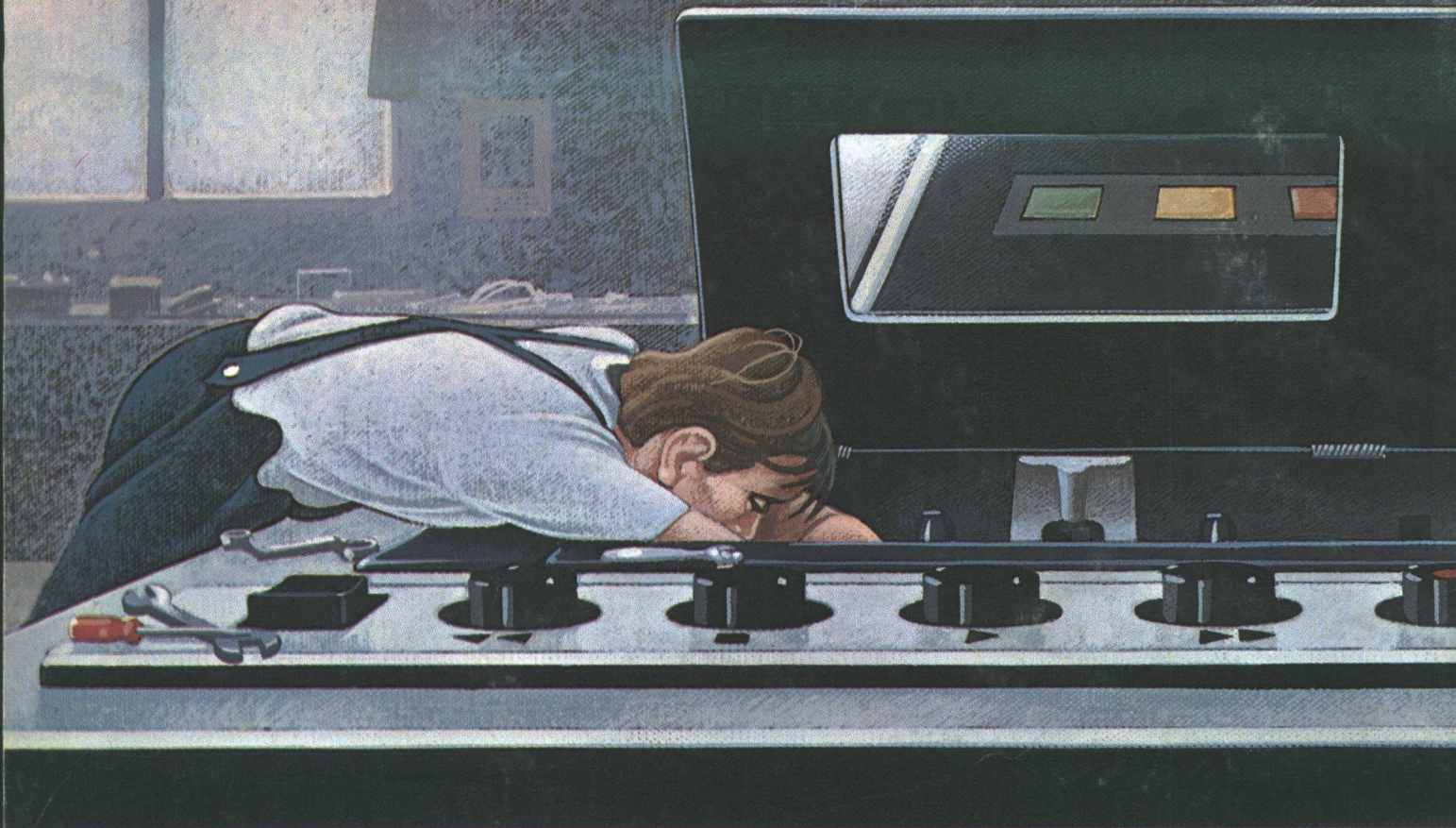
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